AGRICULTURAL IMPACTS OF CROW CHANGE

FINAL REPORT

Bruce Kirk
Food Markets Analysis Division
Marketing and Economics Branch
Agriculture Canada

February 1983

PREFACE

On February 8th, 1982, the government announced its intention to seek a comprehensive solution to western railway transportation problems by revising the Crow's Nest Pass freight rates. Since that time, numerous proposals have been put forward as to how this could be accomplished. This report examines some of the options for Crow reform and the impacts they would have on the domestic agri-food sector.

This report owes much to on-going conversations with Jim Atcheson and Alan Turner in Agriculture Canada as well as David Harvey, currently with the University of Newcastle in England. In addition, Danielle Karamchandani and Fu Lai Tung of the Regional Development and International Affairs Branch of Agriculture Canada, who did the major work in preparing the farm income impacts under very tight deadlines, must be thanked. Any remaining errors remain the responsibility of the author. Finally, the views expressed in this report belong to the author and do not necessarily represent those of Agriculture Canada.

EXECUTIVE SUMMARY

Introduction

The Crow rates have created a misallocation of resources both within Prairie agriculture and between regions by maintaining Prairie farmgate grain prices at artificially high levels. In general, prices across Canada usually differ by handling and transport costs. In the case of statutory grain, however, prices in western and eastern Canada differ by transport rates rather than costs. Hence, under normal market conditions, Prairie farmgate grain prices are, for the most part, equal to export prices minus the handling and transport costs incurred in moving grain to export positions like Thunder Bay. With below-cost freight rates, farmgate prices of Crow grain in the west are higher relative to what they would otherwise be if rates more closely reflected actual transport costs, and higher relative to grain prices in eastern Canada.

The price of all Crow grain, and not just that which is moved for export off the Prairies, is higher due to the Crow rates. This means that the western livestock and grain and oilseed-using industries have had to pay artificially higher prices for their raw seed inputs relative to other grain-using areas. This has reduced the processing margins of these industries and restricted their otherwise natural incentives to expand. Moreover, the Crow rates have tended to promote the production of statutory grain on the Prairies at the expense of other crops. As a consequence of the Crow, farmgate prices of Crow grains have generally been higher in relation to the prices of non-Crow crops which must bear the full costs of transportation. As a result, Prairie farmers have had less incentive to diversify their crop mix.

While the Crow rates have meant higher farmgate grain prices in western Canada, they have had no impact on grain prices in the east. Western feed grains like barley compete with corn as feed substitutes in both international and eastern domestic markets. Because of the dominance of corn in feed grain production, prices of western feed grains in the east are generally determined by the price of corn. That is, eastern livestock producers have not had to pay either higher or lower prices as a result of the Crow.

The Crow has produced a slight and unintended benefit to eastern agriculture, however. Both hog and cattle prices are set on the North American market. Lower livestock production on the Prairies, caused by artificially high feed grain prices in the west, has marginally reduced the supplies of red meats on the North American market, thereby leading to a small increase in livestock prices. This has tended to promote, to a small degree, livestock production in eastern Canada and the United States. Furthermore, this benefit would continue to increase as the gap between the Crow rates and the costs of transportation widened in the absence of Crow change.

Impacts of Crow Change

Increasing the Crow rates will reduce Prairie farmgate grain prices from what they otherwise would have been and this will lead to expanded livestock production and oilseed crushing in the west. In addition, acreage and production of Crow grains should increase as mainline rail capacity expands over the decade and results in higher delivery quotas. The impacts of Crow change on eastern Canada will be minimal because grain and oilseed prices east of Thunder Bay will not be affected. Expanded western beef output may displace some beef imports into eastern Canada but will more likely go into the western U.S. market. Increased western pork production will be shipped into the western U.S. or overseas markets but will not go into the eastern domestic market because eastern Canada is on a net export basis. To the extent that total North American meat supplies will increase due to expanded output from the west, there will be a slight depressing effect on feeding margins in the east; however, this does not imply a fall in eastern livestock producer incomes from current levels but instead from future levels that would have occurred if the Crow had not changed.

Alternative Policy Options

Four policy options were chosen for analysis in this study. The first corresponds with the cost-sharing and method-of-payment proposals put forward in the Gilson report. The second option represents a variation of Gilson's recommendations, wherein grain shippers would pay for all grain rail cost increases beyond 1985-86. The third option, which has been strongly supported by most farm groups in eastern Canada, would involve the federal government paying the 1981-82 gross railway revenue shortfall to the railways in perpetuity, with grain shippers paying for all cost increases beyond 1981/82. The fourth option was that put forward by the Prairie wheat pools. All non-statutory grains and grain products would be put under Crow and an annual payment, cost-shared between the government and grain shippers, would be paid to western livestock producers whose output is slaughtered on the Prairies.

Three sets of grain rail costs were projected to 1990-91 under different assumptions about volumes to be moved, the future course of inflation, and the 1981-82 grain rail cost base. These three sets of grain rail costs represent a low, high and medium "state-of-the-world" or cost scenario. The four policy options were examined for the medium rail cost scenario. As well, the implications of the Gilson proposals were estimated under the low and high cost scenarios. Finally, the impacts of immediately introducing compensatory or full-cost freight rates were estimated, assuming that the total amount of government compensation would be the same as under the Gilson proposals but that it would all be paid to producers.

Nine sets of Crow change real final product (RFP) impacts, measuring changes in value-added in livestock and agricultural processing production, and five sets of farm income impacts were estimated in 1990-91 by agricultural sector and by province/region. Some of the data used to project these impacts were taken from background information compiled for the Feed Grain Policy Review. An explicit attempt to measure the effects on grain production from removing the threat of the western mainline rail capacity constraint was incorporated into the analysis for the impacts measured under the high and medium rail cost scenarios. Grain production was assumed to be constant under the low rail cost scenario even though rail capacity was still assumed to expand.

Real Final Product Impacts

There would be a significant negative RFP impact on the Prairie grain sector from Crow change if grain production were to remain static because higher freight rates would result in some exports being diverted to domestic use. The loss would be felt most strongly in Alberta/B.C. and to a lesser extent in Manitoba, while the impact on Saskatchewan would be negligible. On the other hand, increasing grain production over the decade would lead to substantial positive grain RFP impacts relative to what they otherwise would have been in 1990-91. Grain production would increase by $2.2 billion to over $2.7 billion, measured in 1990 dollars, across different policy options. Saskatchewan would be the major beneficiary, accounting for 68-80% of the potential gain in grain production.

The Prairie livestock and agricultural processing industries will expand under all policy options, with the Pools' proposal giving the biggest RFP gain in livestock as a result of the annual livestock payments. Livestock production under the Gilson proposal would increase by $1.1 billion, compared with the eastern proposal of just under $700 million. In general, the expansion in Prairie livestock output will be larger the more closely freight rates on grain are to compensatory rates over the period to 1990-91, with the exception of the Pools proposal. The livestock RFP estimates are relatively invariant to whether grain production expands to meet projected export targets or remains constant over the period.

More than half the RFP gain in hog production would be felt in Alberta/B.C., with the largest share accruing to Alberta. Saskatchewan would experience the smallest share of increased livestock output. Over 75% of the increase in beef production would occur in Alberta B.C. with Manitoba and Saskatchewan sharing the remaining increase about equally.

The processing gain in the west will be in meat packing, feed milling and oilseed crushing. The Pools' proposal would generate the largest increase, amounting to just over $400 million in 1990-91, as a result of the greater increase in livestock

production under this option. The Gilson proposal would generate a gain in processing output of nearly $380 million, or about $200 million more than what would result from the eastern option.

The negative impacts on the eastern livestock industry in 1990-91, measured from what would have occurred if the Crow were left unchanged, are very small, ranging from -$21 million under the eastern option to about -$40 million under the Pools' proposal. The drop in eastern hog production would be -$7.5 million under the eastern proposal and -$13 million under the Gilson option. The impact on Quebec would be slightly higher than on Ontario under all options while the impact on the Atlantic region would be, for all intents and purposes, virtually insignificant.

The negative impacts on eastern beef production would be felt most strongly in Ontario because of the much larger cattle feeding sector in that province. It should be noted, however, that the negative beef impacts have been overestimated because they do not include the positive effects that would accrue to the cow-calf sector in Ontario from Crow change.

The grain sector impacts in eastern Canada represent only decreased feed use as a result of the livestock estimates. Because the prices of Crow grain east of Thunder Bay will be unaffected by changes in the statutory rates, there will be no other impact on eastern grain production.

In estimating the 1990-91 RFP impact of Crow reform on the western crushing industry, it was assumed that there would be a 25% increase in the current amount of canola crushed on the Prairies. It was further assumed that this increase would represent a diversion from the eastern crushing industry. The loss to eastern Canada in 1990-91, relative to what crushing output would have been without Crow change, would be -$23.9 million across all policy options.

Impact on Net Farm Income

Under the status quo situation of no-Crow change, realized net farm income in 1990-91 is expected to be about $6.4 billion in Canada, about 48 percent above the 1981 level of $4.3 billion. Regionally, the increases in realized net farm income for the period 1981 to 1990 are expected to be about 47 percent for the eastern region and about 50 percent for the western region. These rates of increase are much less than the period between 1971 and 1981 for which the increases were 240 percent and 271 percent respectively. The slowdown in the growth rate of realized net farm income in the base case for the western region results from the expected railway transportation constraint.

For the category "all farms" in western Canada, the Pool's proposal could increase aggregate realized net farm income by about $1.5 billion as compared with the increase of $992 million under the Gilson option. Once compensation is taken into account,

however, the Gilson option would give the greater increase in income. The eastern option would increase total western net farm income by the same amount as the Gilson option before compensation is taken into account but would be significantly less after compensation is included.

On a per farm basis, livestock farms in Alberta/B.C. would gain the most over all farm types across the Prairies once compensation is taken into account. Grains plus oilseeds farms in Saskatchewan would fare nearly as well and much better than similar farms in Manitoba and Alberta/B.C. Livestock farms in Manitoba and Saskatchewan would experience the same magnitude of income gains after including compensation.

Realized net farm income in eastern Canada would be slightly lower in 1990-91 relative to what would have occurred in the no-Crow change case. The reduction would range from -$12 million under the eastern proposal to -$34 million under the Pools' proposal. The Gilson proposal would result in a negative impact of -$20 million. Ontario would be the biggest loser under most options because of its large cattle feeding sector relative to the rest of eastern Canada. (It should be noted, however, that the positive impact on the cow-calf sector is not reflected in the income estimates.) The negative impact on the Atlantic region would appear to be insignificant.

Concluding Comments

The estimated impacts of the various options to revise the Crow rates show orders of magnitude and directions of change only due to the inherent problems in forecasting over the long term. Hence, small impacts should be interpreted as insignificant while large impacts should be judged important.

The value of increased Prairie grain production attributed to the planned rail capacity expansion should thus be viewed as "ballpark" estimates only. Moreover, limitations in the methodology used to generate the livestock impacts likely imply that the forecast expansion in Prairie livestock output following Crow change has been somewhat overestimated, and that the projected negative effects on the eastern livestock sector have been substantially overestimated. It should be noted, however, that the livestock estimates in this study are of the same order of magnitude as a recently completed study on Crow change by Chase Econometrics. Finally, the estimated impacts on the agricultural processing industries both east and west should be treated as the maximum likely effects following Crow reform.

Underlying the empirical analysis are some general assumptions. In particular, it was assumed that there will be no supply management in the red meats sector over the forecast period, there will be no major changes in Feed Grains Policy such as the

elimination of Feed Freight Assistance, and that trade flows of livestock and meat will not be disrupted as a result of Crow change.

A good deal of concern has been expressed by eastern agricultural groups about whether the last assumption will hold up, particularly for hog exports to the U.S., under the Gilson option. It is unlikely, however, that the difference in western hog expansion under the Gilson and the eastern proposals would by itself trigger countervailing U.S. action. In addition, the U.S. Meat Import Law does not apply to pork, while the threat of countervailing trade sanctions always exists when an attempt is made to increase exports. It seems perverse, therefore, to suggest that western pork production should be restrained in order to limit total pork exports when there is no solid evidence that countervailing action may result. In the case of beef, if western production does trigger the U.S. Meat Import Law - an unlikely prospect given the size of the Canadian allocation relative to the total allocation - then western beef exports to the U.S. would move as live cattle instead of meat.

TABLE OF CONTENTS

PREFACE

EXECUTIVE SUMMARY

		PAGE
I	INTRODUCTION	1
II	ECONOMIC IMPLICATIONS OF CROW RATE CHANGE	2
	1. The Crow Impact on Domestic Agriculture	2
	a) Western Canada	2
	b) Eastern Canada	5
	2. Effects of Crow Change	6
	a) Western Canada	6
	(i) Grain Production	6
	(ii) Livestock Production	7
	(iii) Agricultural Processing	8
	b) Eastern Canada	9
	(i) Grain Production	9
	(ii) Livestock Production	9
	(iii) Agricultural Processing	11
	3. The Mechanics of Crow Change	12
III	METHODOLOGY, INPUT DATA AND ASSUMED POLICY CHANGES	14
	1. Methodology	14
	a) Real Final Product (RFP) Impacts	14
	b) Farm Income Impacts	15
	2. Policy Options	16
	3. Input Data Projections	17
	a) Statutory Grain Volumes	17
	b) Rail Cost and Freight Rate Projections	19
	c) Grain and Livestock Price Projections	23

PAGE

IV REAL FINAL PRODUCT (RFP) IMPACTS IN 1990-91 25

1. Western Canada 25

a) Grain Impacts 25

b) Livestock Impacts 27

c) Agricultural Processing Impacts 28

2. Eastern Canada 30

a) Grain Impacts 30

b) Livestock Impacts 30

c) Agricultural Processing Impacts 31

3. Total Domestic Effects 34

V FARM INCOME IMPACTS IN 1990-91 36

1. Western Canada 36

2. Eastern Canada 39

3. Total Domestic Impacts 41

VI ASSESSMENT AND OBSERVATIONS 45

1. Assessment of the Estimated Impacts 45

a) Grain Production Estimates 45

b) Livestock Impacts 46

c) Agricultural Processing Impacts 47

2. Sensitivity of the Estimates 48

FOOTNOTES

BIBLIOGRAPHY

APPENDICES

I Theoretical Analysis of the RFP Agricultural Impacts of Crow Change

II Grain Handling and Transportation System (GHTS) Cost and Rate Projections

III Grain and Livestock Price Forecasts

IV Methodology and Estimates of the Real Final Product (RFP) Impacts in 1990-91

V Methodology and Estimates of the Net Farm Income Impacts

Footnotes - Appendices

CHAPTER I

INTRODUCTION

The Crows Nest Pass freight rates, applying to the rail movement of statutory grain and grain products off the Prairies, were originally designed to promote the growth of agriculture in western Canada. More recently, however, there has been a growing recognition that the Crow rates have become an increasing handicap to the continued development of Prairie agriculture as well as being a major cause of the railways' inabilities to expand mainline capacity in the west to meet expected increases in rail traffic. In addition, they have led to an increasing financial contribution from the federal government to maintain the western grain transportation system. The focus of the debate has thus shifted from whether to keep the Crow rates to the more appropriate question of how best to revise them. The purpose of this report is to present estimates of the potential impacts on agriculture of various proposals that have been made to restructure the Crow rates[1].

Chapter II contains a qualitative assessment of both the impacts that the Crow has had and the implications that Crow change will have on the grain, livestock and grain-using industries in both western and eastern Canada. Chapter III provides a description of what impacts have been measured with a summary of how the analysis was carried out. Further details are given in the Appendices. Chapters IV and V discuss the empirical estimates of both the real final product and net farm income impacts with the complete estimates given in Appendices IV and V. Chapter VI assesses the results and indicates that the projected impacts should be interpreted only as orders of change; that is, while one can have confidence in impacts that are large, small impacts can likely be discounted. The sensitivity of the estimates to the underlying assumptions used in the analysis are also briefly discussed.

CHAPTER II
ECONOMIC IMPLICATIONS OF CROW RATE CHANGE

1. The Crow Impact On Domestic Agriculture

While the Crow rates are both a transportation and a financial problem, they also pose a major constraint to the continued development and diversification of western agriculture. To understand the necessity for, and the implications of, Crow change on the domestic agri-food sector, it is important to appreciate the basic problems inherent in the Crow rates.

a) Western Canada

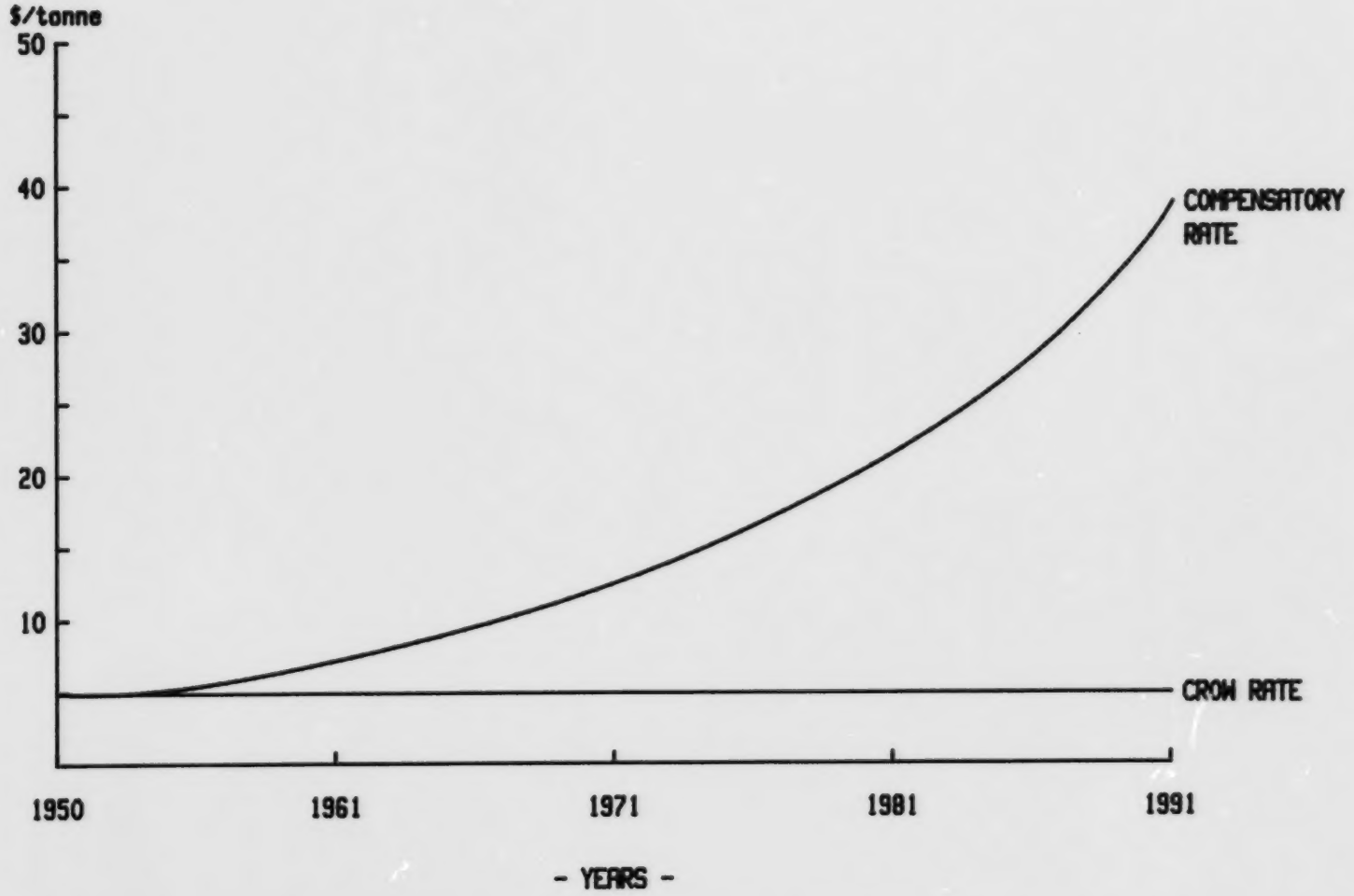
Graph I shows the time path of both the Crow rate and the full cost or compensatory rate in moving grain from about 1950 and projected to 1991. Because of the fixed nature of the statutory rate, inflation in grain transportation costs since 1950 has produced a widening gap between the actual costs of moving grain and what producers have paid via the statutory rates. By 1981, shippers of statutory grain paid only about 20% of the costs of moving grain and it is projected that they will be paying less than 10% by 1990 if the Crow is left unchanged.

The original purpose of the Crow rates was to foster agricultural growth in the west, and for many years they served this purpose well. By the late 1960's, however, the lack of railway investment in grain transportation as a result of mounting grain rail losses had produced severe strain in the grain handling and transportation system. Despite numerous administrative measures and some $1.8 billion of federal funds, the problems of inadequate rail capacity and a deteriorating branchline network continued to worsen throughout the 1970's .

The introduction of Canadian Wheat Board delivery quotas in conjunction with the block shipping system in the late 1960's served the dual purpose of ensuring that each grain shipper had equitable delivery access as well as rationing scarce delivery capacity. Restrictive delivery quotas stemming from inadequate transportation capacity resulted in lost and deferred grain export sales amounting to nearly $1 billion by the end of the 1970's[2]. On-farm storage costs increased as well, reaching as high as $100 million in 1978-79 for wheat alone[3].

Even with branchline subsidies and other government programs such as the purchase of hopper cars and the branchline rehabilitation program, railway losses from moving grain at the Crow rates have continued to escalate. Leaving the Crow as it is will only aggravate the financial condition of the railways and further reduce

GRAPH 1 - CROW AND COMPENSATORY RATES



their abilities to expand rail capacity in the west, particularly the critical mountain mainlines through to the west coast. Projected increases in westbound bulk commodity traffic such as coal, potash, sulphur and grain will lead to greater congestion on the existing mountain mainlines, inevitably bringing about mainline traffic rationing and reducing the growth not only of Prairie grain production but of other western bulk commodity industries as well.

In addition to the impact on railway capacity, the Crow has also led to a misallocation of resources both within the Prairies and between regions by creating an artificially low spread in statutory grain prices between the Prairies and eastern Canada. In general, prices across Canada usually differ by handling and transport costs . In the case of statutory grain, however, prices in western and eastern Canada differ by transport rates rather than costs. In the absence of marketing or transportation constraints, Prairie farmgate grain prices are, for the most part, equal to world or export prices minus the handling and transport costs incurred in moving grain to export positions like Thunder Bay[4]. With below-cost freight rates, farmgate prices in the west are higher relative to what they would otherwise be if rates more closely reflected actual transport costs, and higher relative to grain prices in eastern Canada.

Because nearly two-thirds of Prairie grain production is traditionally sold off the Prairies, the local market there tends to be a residual or price-taking market. Hence, prices of Crow grain sold locally normally reflect the farmgate prices of grain sold for export. This means that the prices of all statutory grains, and not just that which is moved off the Prairies, are higher due to the Crow. The western livestock and grain and oilseed-using industries have thus had to pay artificially higher prices for their raw seed inputs relative to other grain-using areas. This has reduced the processing margins of these industries and hence their otherwise natural incentives to expand.

There have, of course, been times of distress grain sales due to large grain surpluses on the Prairies. These have occurred both because of worldwide excess grain supplies and because of the inability of the handling and transport system to move available quantities of grain to export positions. The Prairie livestock and further processing industries have been able to take advantage of low grain prices during these short periods and this has provided some offset to the Crow distortion. It has also distorted the normal production cycles in Prairie livestock, however[5].

Prior to 1970, the low spread in domestic grain prices probably was not significant. With much higher rates of inflation in the 1970's, however, this distortion in grain prices took on increasing importance with the result that the current competitive balance in agriculture west and east discourages Prairie grain-using industries such as livestock[6]. In addition, the fixed nature of the Crow rate means that this distortion will worsen over time if these rates are left unchanged.

Finally, the Crow has also promoted the production of statutory grain on the Prairies at the expense of other crops. As a consequence of Crow, farmgate prices of Crow grains have generally been higher in relation to the prices of non-Crow crops which must bear the full costs of transportation. As a result, Prairie farmers have less incentive to diversify their crop mix. Moreover, the existing disincentive to crop diversification will increase over time in the absence of Crow reform[7].

In summary, the Crow impact on the western agricultural economy has meant a dominance of, and dependence on, production of statutory grains for export with a concomitant loss of economic output from lower levels of grain processing and livestock production. Moreover, an inadequate transportation system has led to restrictive delivery quotas, higher storage costs and less than potential grain production, thereby reducing total grain income as well as income from associated activities such as fertilizer sales and farm implement purchases.

b) Eastern Canada

While the Crow rates have meant higher farmgate grain prices in western Canada, they have had no impact on grain prices in the east. Western feed grains like barley compete with corn as feed substitutes in both international and eastern domestic markets. Because of the dominance of corn in feed grain production, prices of western feed grains in the east are generally determined by the price of corn. That is, eastern livestock producers have not had to pay either higher or lower prices as a result of the Crow.

The Crow has produced a slight and unintended benefit to eastern agriculture, however. Both hog and cattle prices are set on the North American market. Lower livestock production on the Prairies has marginally reduced the supplies of red meats on the North American market, thereby leading to a small increase in livestock prices. This has tended to promote, to a small degree, livestock production in Eastern Canada and the U.S. Furthermore,

this benefit will continue to increase as the gap between the Crow rates and the costs of transportation widen in the absence of Crow change.

2. Effects of Crow Change

a) Western Canada

Freight rate changes will be reflected in lower farmgate prices of grains and oilseeds on the Prairies. This, in turn, can be expected to affect the use of farmland among various crops, the use of grain to be fed to livestock on the Prairies, and the processing of crops and livestock in the west.

(i) Grain Production

An increase in the Crow rates will have little influence on world prices of statutory grains, but will instead be fully reflected in reduced Prairie farmgate prices from levels that would otherwise have obtained. Since Crow grains are not priced equally, any change in freight rates will result in different percentage changes in farmgate prices. This will lead to relatively more production of the higher-valued Crow crops like wheat and rapeseed and relatively less production of the lower-valued crops like barley[8]. In addition, farmgate prices of statutory grains will fall relative to the prices of non-Crow crops and this should lead to an increase in the acreage seeded to these crops. On balance, however, the total acreage seeded to Crow grains will likely increase. The tendency for it to fall, as marginal land becomes unprofitable and as acreage is switched from Crow to special crops, will likely be more than offset by the effect of higher delivery quotas as increased transport capacity comes on stream later in the decade.

There is widespread agreement that the Prairie region will be capable of producing about 50 million tonnes of statutory grain on a sustained basis by 1990. This would translate into exports of 36 million tonnes, up 33% from the record level set in the 1981-82 crop year and equal to the Wheat Board's export target for 1990. It is reasonable to expect greater production of statutory grain as transport capacity and, hence, delivery opportunities improve over time.

Although increasing the freight rates will reduce the income per tonne received from marketing grain relative to keeping the Crow, total grain income will increase due to greater production and volumes

marketed and from reduced storage, handling and interest costs in response to a more efficient and higher throughput handling and transport system.

(ii) Livestock Production

Reduced farmgate prices of Crow grains following an increase in the statutory freight rates will mean lower feeding costs for the western livestock industry. Hog output will increase directly in response to improved feeding margins relative to what would otherwise have occurred. Western Canada is currently on a net export basis in pork production so that increased output will go into the export market, most likely to the U.S. south and southwest. It is doubtful that increased western hog production will be shipped into the eastern domestic market given that projected feed cost savings will not be sufficient to overcome the cost of transporting meat from west to east in relation to interregional differences in hog prices[9].

The western cattle industry also stands to benefit from reduced feed grain prices on the Prairies, although increased western beef output will only occur over the longer term. A Crow-induced expansion in western beef output will be contingent on growth in the cow-calf herd, and this will depend on improved margins in the fed beef sector being bid into feeder calf prices. If there is a significant supply response, then fed cattle output from the west could decline in the short to medium term as the breeding herd is built up. As the cow-calf herd expands over time, however, the supply of feeder cattle will increase resulting in a long run expansion in western beef output.

It is worthwhile to point out that both the size and speed at which western hog and beef production would expand in response to higher freight rates have been subject to some debate. There is general agreement, however, on the direction, if not the magnitude, of change.

Finally, it is not expected that higher freight rates and reduced feed grain prices will have much impact in the supply-managed areas of poultry and dairy. Provincial quotas have not been reallocated in the past as regional costs have changed. There may be a small impetus to growth, relative to what it otherwise would have been, if retail prices on the Prairies reflect reduced feed costs, thereby increasing consumer demand for these products[10].

(iii) Agricultural Processing

Lower farmgate prices of Crow grain will remove a major impediment facing the oilseed crushing and feed milling industries in the west. As with the livestock sector, processing margins will improve leading to increased output. In addition, the meat packing industry on the Prairies will increase its output over time with rising production of hogs and fed cattle. The availability of lower priced feed grains should improve the cost efficiency of feed mills on the Prairies, and the livestock sectors that use prepared feeds should benefit accordingly. Moreover, to the extent that western beef and hog output increases in response to higher freight rates, there will be increased demand for manufactured feeds. This would increase the utilization of existing plants and could lead to an expansion of feed milling capacity later in the decade .

The availability of livestock slaughter and meat packing capacity in the west to handle the increased output would not appear to be a problem due to existing excess capacity in the industry. Hence, the industry would seem to be fully capable of handling increased livestock output, at least in the short run. Over the longer term, increased meat packing on the Prairies commensurate with greater livestock output could depend on achieving higher economies of scale and processing efficiencies, particularly if the western packing industry is to continue competing with its counterpart in the U.S. and eastern Canada. Otherwise, increased livestock production may move out of the west "on the hoof" for processing elsewhere[11].

The western oilseed crushing industry has suffered from the Crow distortion in that below-cost freight rates have raised the farmgate price of seed on the Prairies and thereby increased input costs for western crushers. This distortion has been partially offset by the government's $3 million rapeseed crushing assistance program and minimum compensatory freight rates (MCR's) on canola oil and meal moving east of Thunder Bay. Whether MCR's will continue once the Crow is changed has been the subject of much debate. What is clear is that applying commercial rail rates on canola oil and meal moving east of Thunder Bay will reduce, if not eliminate, the benefits western crushers will receive from Crow change on the eastbound movement of their products. The impact of the Crow has meant that off-Prairie, and especially foreign, processors have been able to buy Prairie canola seed and process it with a comparative advantage relative to the western crushing industry.

In effect, the Crow has promoted canola crushing outside the Prairie region[12].

Higher freight rates will reduce the price of canola seed at all Prairie points, increasing the processing margins of western crushers. Furthermore, the industry, which has sometimes suffered from tight seed supplies and high prices in the face of continuing strong foreign demand, should benefit in that canola production will increase as farmers switch from lower to higher valued crops. Both of these factors will help the western crushing industry to operate at more efficient and sustained production levels in the long run.

b) Eastern Canada

(i) Grain Production

Grain production in eastern Canada is projected to increase significantly by 1990. Quebec, which is currently about 46% self-sufficient, is expected to be over 80% self-sufficient by the end of the decade. Grain production is forecast to double in both Nova Scotia and New Brunswick so that by 1990 self-sufficiency in the Atlantic region will have increased to 55%. Ontario is already a net exporter of grain and production is expected to increase over the decade but at a slower pace than occurred during the 1970's[13].

It is likely that the increasing grain production in eastern Canada will at least partially displace western barley and U.S. grain (especially corn) imported into the region. This will depend on locally produced grain being priced competitively with western and U.S. grain. Increased freight rates will not affect this process because higher transport costs on Prairie grain moving east will be reflected in reduced farmgate prices in the west.

(ii) Livestock Production[14]

An increase in the statutory freight rates will increase the spread in feed grain prices between east and west as farmgate prices of Crow grains fall in the west. As discussed above, expansion in western beef production will be contingent on increased supplies of feeder cattle. Because it will take a few years for the cow-calf sector to expand, the price of feeder cattle will rise both east and west, with some reduction in the number of feeder calves moving from the Prairies into eastern feedlots. Increased feeder

calf prices will benefit the eastern cow-calf sector but will somewhat reduce the operating margins of the fed beef sector in eastern Canada. The latter effect will occur because livestock prices in Canada are set on the North American market and greater western beef production will increase total North American beef supplies very slightly and, hence, have a very slight depressing effect on cattle prices relative to a situation of no-Crow change. As well, current health regulations prevent importing live cattle less than one year old so that the increase in feeder calf prices will not be offset by importing lower-priced feeder calves from the eastern and southern U.S. These impacts, positive for the eastern cow-calf sector and slightly negative for the fed beef sector, will be much less in Quebec and the Atlantic region than in Ontario because both the cow-calf and fed beef sector are primarily located in Ontario.

Overall, then, there will be both positive and slightly negative impacts on the eastern cattle industry. Fed cattle prices will remain in line with U.S. mid-west prices; however, Crow change will help to spur eastern cow-calf production which is necessary in any event if eastern Canada is to expand beef production over the long term.

Any impact on the hog industry in eastern Canada following a change in the Crow rates will likely be small. Eastern Canada, in particular Quebec, is a net exporter of hogs. Trade in pork between western and eastern Canada is not now significant due to the costs of transporting meat relative to the difference in hog prices east and west. Increased hog production in western Canada will not be shipped into eastern domestic markets, but will instead be exported. Increased competition from western pork with eastern production in the U.S. market will be only indirect as increased western exports will go into south and southwest markets in the U.S. given current transport costs. However, there may be increased competition in the Japanese market, although exports of pork from Quebec have the advantage of low water backhaul rates relative to increased Prairie exports to Japan.

Canadian hog prices are set on the North American market with regional prices differing by transportation costs. Because eastern Canada is a net exporter of pork, hog prices there are already at the export floor. This export floor price will be only indirectly affected by increased western production which will increase total North American supplies of pork. However, because hog production in western Canada is such a small part of total North American

production, any production increase in western Canada following a change in Crow will have only a marginal impact on total supplies of pork and, hence, only a very slight depressing effect on hog prices in eastern Canada.

There could be a positive impact on the dairy sector in eastern Canada following a change in the Crow rates. This would reflect the increased opportunity to feed dairy calves to heavier weights because of higher feeder cattle prices.

Both dairy and poultry producers are protected from cost increases through the use of cost-of-production pricing formulae. Under the present national cost of production formula for eggs, lower feed grain prices in western Canada will be reflected in a lower national cost of production and hence in egg prices. The effect will be minimal, however, because of the low weighting of western provinces in the formula. This situation would not apply for broilers and turkeys where the cost-of-production formulae use provincial feed cost factors. In addition, the national dairy cost-of-production formula uses only input costs from eastern Canada; hence, lower Prairie grain prices will not be reflected in this formula.

(iii) Agricultural Processing[15]

Increased freight rates on canola seed will not affect the landed price of seed in Ontario, but will instead be reflected in lower western farmgate prices. This will reduce input costs to western crushers from what they otherwise would have been and will make canola crushing in the west relatively more attractive than in the east. However, if canola crushing in eastern Canada is presently an attractive proposition, it will tend to remain so, as increasing freight rates on seed over time will be absorbed in reduced Prairie farmgate prices, and landed seed prices in eastern Canada will effectively remain unchanged from what they otherwise would have been.

In the short run, reducing freight rates on canola products to the level of the Crow rates will have very little, if any, impact on soybean prices or production in Ontario. Canola meal already moves at Crow to Thunder Bay. Putting canola oil under Crow will not reduce the landed price of oil in eastern Canada. This may depend on both oil and meal retaining minimum compensatory rates east of Thunder Bay, however. In the long run, canola products may continue to make inroads into eastern domestic markets at the expense of Ontario soybean products, regardless of what

happens to Crow. If the statutory rates on seed remained fixed, then the only impact would be an accelerated shift of the canola crushing industry to Ontario due to an increasing Crow distortion. Canola oil now accounts for close to 50% of the domestic vegetable oil market. However, it is the location of the canola crushing industry and not the ability of canola products to penetrate eastern domestic markets that is contingent on removing the Crow distortion. The effect of removing this distortion on the ultimate location of the domestic canola crushing industry may depend on whether canola oil and meal continue to move at minimum compensatory rates, instead of the higher commercial rates, east of Thunder Bay.

It is unclear whether Crow change will affect meat processing in eastern Canada. The discussion above indicates that the impact on eastern hog production and, therefore, processing will be negligible. If a substantial shift in cattle feeding from east to west follows an increase in the statutory rates, then there could be a parallel adjustment in beef processing. This will depend on the extent to which increased western beef production will be exported as processed product as opposed to shipments of live cattle. Moreover, any decline in eastern fed beef production could be offset by increased imports of live fed cattle from the U.S. depending on the relative west-to-east transportation rates on meat.

3. The Mechanics of Crow Change

The government's February 8th, 1982 Policy Statement on the Western Railway Transportation Initiative made it clear that compensation will be paid for changing the Crow rates. There is a distinct relationship between the Crow distortion and the payment of compensation for changing the Crow rates. Increasing the Crow rates will reduce the existing distortion and this is independent of whether, but not how, compensation is paid. For example, going immediately to full-cost or compensatory rates will reduce farmgate prices of all statutory grain, regardless of whether it is sold locally or moved off the Prairies. In such a case, the distortion will be completely eliminated, even if no compensation is paid to grain producers. If compensation is paid to the railways, however, then freight rates will increase by a lesser amount or not at all, depending on the size of the payment. Farmgate prices will not fall as much and this will perpetuate a distortion against further processing and the livestock sector on the Prairies. If compensation is paid to producers, then rates will more closely reflect actual transport costs and farmgate prices for all statutory grain will be reduced, thereby encouraging the further processing of grain in the

west. In general, the faster and more closely freight rates reflect transport costs, the greater will be the reduction in farmgate prices with the subsequent gains in Prairie livestock and grain processing being larger and more immediate[16].

The payment of government compensation, either to the railways or to producers, can be justified on the grounds that the Crow benefit has been built into the production and investment decisions of grain producers. In particular, the value of the Crow rates has likely been capitalized in the form of higher land values. Eliminating the railways' losses from moving grain without paying compensation implies moving to full-cost freight rates at once, and this would pose severe adjustment problems for many producers.

The basic problem in making payments to producers is to ensure that the distribution of payments reflects the distribution of the Crow benefit while at the same time ensuring that both the impediments facing the livestock and further processing industries are removed as well as the disincentives to crop diversification. For the purposes of this study, it has been assumed that any producer payment scheme will reduce the Crow distortion against Prairie livestock and agricultural processing production[17]. In addition, it has also been assumed that the Crow disincentive to crop diversification will be reduced because producer payments will be based on some historical measure such as acres, production, marketings or rail shipments. The remaining question is then one of equity; that is, paying compensation to those who currently benefit from the Crow and to those who will be disadvantaged when the freight rates increase. There are some remarkably contentious issues involved in this latter question[18], some of which will be discussed in Chapter VI.

CHAPTER III

METHODOLOGY, INPUT DATA AND ASSUMED POLICY CHANGES

1. Methodology

In order to measure the effects of Crow change discussed in the previous chapter, both real final product (RFP) and farm income impacts, based on various Crow rate reform options, were estimated.

a) Real Final Product (RFP) Impacts

The real final product impacts represent changes in value-added, relative to the base case of keeping the Crow, for selected agricultural sectors in 1990-91. The RFP impacts were measured at the boundaries of western and eastern Canada and were disaggregated to the provincial/regional level by pro-rating the results according to existing production patterns. RFP impacts in western Canada were estimated for the grain, livestock (hogs and beef), canola crushing, feed milling and meat packing sectors. Based on the analysis of Crow change impacts on eastern agriculture from Chapter II, RFP impacts for livestock, both hogs and beef, and for canola crushing were estimated in eastern Canada.

The RFP impacts were generated by following the analysis developed by Harvey[19]. Appendix I contains a theoretical interpretation and discussion of this approach to analyzing the impacts of Crow change while Appendix IV specifies the mechanics involved in producing the RFP estimates contained in this report.

Two significant departures from Harvey's RFP analyses were made for this study. In the first place, all results have been estimated in the year 1990-91 relative to the base case of what would have occurred in that year if the Crow had been maintained. In the second place, an explicit attempt was made to incorporate the potential impact of the threatened mainline rail capacity constraint through the western mountains in the base case. Appendix I contains both a description and analysis of the transport constraint measures derived for this study while Chapter VI contains an assessment of the estimated impacts.

Previous analyses of Crow change have not dealt with the mainline capacity problem, presumably on the grounds that the Crow is not directly linked with resolving the capacity issue. That is, the government could, in theory, pay the railways to expand mainline capacity and retain the Crow rates. The government's February 8, 1982 Policy Statement on the Western Railway Transportation

Initiative, however, made it clear that the government is unwilling to divorce the issue of statutory grain rail losses from the growing capacity problem due to its fiscal constraints and spending priorities. As a practical matter, therefore, expanded western grain production to meet achievable targets is now contingent on Crow reform.

Base grain production levels in 1990-91 were developed by assuming that 1982-83 production volumes, for the most part, will represent a maximum over the decade given the assumption that Crow is not changed. Based on this latter assumption, there will likely be an on-going transport constraint in moving bulk commodities to West coast ports. It is assumed that this will lead to restricted Wheat Board delivery quotas which in turn will inhibit grain producers from expanding production.

b) Farm Income Impacts

Agriculture Canada maintains a set of budgets for 13 farm types in each province which provide an aggregate income and expense statement for each type of farm. Information on the number of farms of each type is available so that it is possible to devise an income and expense statement for the average farm of each type. These budgets were used to obtain estimates of the impacts of Crow change on farm income by province/region. The methodology follows closely that developed in an earlier paper prepared for the Gilson consultations[20]. More complete details are given in Appendix V.

In determining the effects of a change in the Crow rates on income and expenses in 1990-91, it was necessary to obtain estimates of grain and livestock prices, grain and livestock production levels and the expenses associated with the production of crops and livestock in that year. Much of the basic data required was drawn from the aggregate real final product estimates. Other receipts which would not be affected by changes in the Crow rates were obtained by using the farm budget model. Any effect of reduced grain prices at the farm level on land values was not taken into account.

Estimates of individual receipt and expense items were generated for each province and then allocated to indivudual farm types to obtain income estimates for each type of farm for each province. Provincial estimates were then aggregated to obtain regional estimates. Proposed levels of compensation by province/region were allocated to individual farms on the basis of total cropland acreage and volume of production per farm.

2. Policy Options

In estimating both the real final product (RFP) and farm income impacts of Crow change in 1990-91, it was necessary to make some assumptions about the possible options for revising the statutory rates, both in terms of who might be paid (railways, producers or both) and what share of inflation in future grain rail costs might be borne by the government. In general, alternative policies will produce different freight rates and, hence, will have different impacts on farmgate prices of Crow grain and on subsequent livestock and grain production from the Prairie region. In turn, these options will also have differential impacts on the livestock sector in eastern Canada.

Four policy options were selected for this study, although it should be noted that none have been officially embraced by the government. The first is that put forward in the Gilson Report[21]. To begin with, all government compensation would be paid to the railways. Over a seven year period, acreage-based producer payments would be phased-in so that 80.9% of government compensation would go to producers by 1989-90. In addition, grain producers would pay for all costs associated with statutory grain volumes over the 1981-82 volume plus a maximum of 3% inflation per year up to 1985-86 and 4.5% per year thereafter. The remainder of inflation in grain rail costs would be paid by the government.

The second option represents a variation of Gilson's recommendations. It follows Gilson on the method of payment but would alter the cost sharing proposal. Grain shippers would continue to pay for all volume increases over the amount of statutory grain moved in 1981-82 and would still be subject to paying only a maximum of 3% of inflation up to 1985-86. Beyond 1985-86, however, it was assumed that grain producers would pay for all of inflation.

The third policy option is one that has been strongly supported by the majority of the farm groups in eastern Canada[22]. The government would pay the 1981-82 gross railway revenue shortfall, equal to the total rail costs minus Crow revenues paid by producers in that year, to the railways in perpetuity. Any subsequent cost increases associated with inflation or increasing volumes above the amount moved under Crow in 1981-82 would be picked up by shippers. This proposal would thus cap the government's annual contribution to Prairie grain transportation.

The final option chosen for this study was that put forward by the Prairie Wheat Pools after Gilson made his recommendations. Originally called the W.R.E.F. or Western Feed Grain Rate Equalization Fund proposal[23], it dealt with the method of payment question only, at least in its initial formulation. It specified that the 1981-82 shortfall be paid

to the railways, all non-statutory grains and grain products be put under Crow and that an annual payment, cost-shared one-third/two-thirds by producers and the government, be made to western livestock producers whose output is slaughtered on the Prairies. These livestock payments would cover all livestock sectors except dairy and would be based on estimated feed usage for hogs, beef, poultry, etc. Corresponding to an early draft of the Pool proposal, it was assumed for this study that 80% of the Crow distortion in western feed grain prices would be recompensed through the livestock payments[24].Furthermore, the analysis of the proposal has assumed Gilson's cost and volume sharing recommendations in subsequent years.

3. Input Data Projections

a) Statutory Grain Volumes

Statutory grain volumes were projected for each crop year to 1990-91 from background data prepared for the government's Feed Grain Policy Review (FGPR). Much of these data were compiled by regional staff of Agriculture Canada's Regional Development Branch. In particular, FGPR projections on Prairie grain production, exports and domestic flows represent consensus estimates of what will likely occur under the general assumption that there will be no transportation constraint influencing Prairie grain production in the remainder of the decade.

Table I contains estimates of statutory grain volumes for crop years 1981-82, 1985-86 and 1990-91. The volume estimates, which include all grains, oilseeds and related products that currently move at Crow plus non-statutory shipments of canola and linseed products, are equal to projected exports of the six Crow grains plus the estimated rail movement of statutory commodities for domestic use outside Western Canada. The data on statutory grain production and exports, with the exception of the 1981-82 export figure which was released by the Canadian Wheat Board in August 1982, and domestic feed grain outflow off the Prairies were taken from FGPR estimates, as was the 1981-82 estimate of the total domestic rail movement of statutory commodities. In subsequent years, it was assumed that the non-feed grain component of the domestic rail movement would be constant; hence, the decline in the domestic feed grain outflow off the Prairies accounts for the drop in the total domestic rail movement of statutory commodities. Total statutory grain rail volumes for crop years between 1981-82 and 1985-86 and between 1985-86 and 1990-91, used in projecting annual crop year statutory grain rail costs, were interpolated on the basis of constant growth rates of 1.73% and 3.48% respectively. The higher growth rate

TABLE I

ESTIMATED ANNUAL STATUTORY GRAIN RAIL VOLUMES

- million tonnes -

	1981-82	1985-86	1990-91
Statutory Grain Production	42.1	44.0	49.2
Exports of Statutory Grain	27.2	29.6	36.4
Domestic Feed Grain Outflow Off-Prairies	1.6	1.4	0.8
Total Domestic Rail Volumes	3.8	3.6	3.0
Total Statutory Rail Volumes	31.0	33.2	39.4

Source: Feed Grain Policy Review background data and the Canadian Wheat Board.

after 1985-86 can be interpreted as reflecting the fact that increased rail capacity will come on stream only in the latter part of the decade.

b) Rail Cost and Freight Rate Projections

Three estimates of grain rail costs were projected to 1990-91 under different assumptions about volumes to be moved, inflation and the 1981-82 grain rail cost base. The three sets of rail costs have been referred to as the low, high and medium estimates and have been labelled I, II and III in subsequent tables and text. Table II summarizes the underlying assumptions while a complete description of how these costs were derived is contained in Appendix II, along with the detailed cost estimates.

Combining each rail cost "state-of-the-world" with the policy options described above makes it possible to derive the freight rates that are projected to occur under each option. As well, it is also possible to derive a maximum possible Crow change impact within each set of rail cost estimates by assuming that Prairie grain producers are faced with full compensatory freight rates beginning in 1983-84 and continuing for each subsequent year thereafter. These latter impacts have been labelled CI, CII and CIII in subsequent tables and they indicate the compensatory rate impacts corresponding to the low, high and medium sets of rail costs.

Table III summarizes the agricultural impact scenarios. Three sets of RFP impacts, labelled GI, GII and GIII, have been estimated for the Gilson policy option corresponding to the low, high and medium rail cost forecasts. Thus, GI provides an overall lower bound estimate of the RFP impacts while CII, the option that gives the maximum possible RFP impacts, indicates the upper bound between which all other estimated RFP impacts will fall given the other rail cost and policy option assumptions. The RFP impacts from the remaining policy options have been estimated only for the medium rail cost assumptions. These have been labelled AIII, EIII and PIII corresponding to the alternative or modified Gilson option, the approach favoured by most eastern groups and the Pools' proposal respectively. In addition, the farm income impacts were estimated only for the GIII, CIII, AIII, EIII and PIII options.

Graph II shows the time path of both the Crow rate and the projected freight rates for policy options GIII, CIII, AIII, EIII, PIII up to 1990-91. It is readily apparent that full-cost or compensatory freight rates will be the highest in each year after 1982-83. The freight rates under AIII, the alternative or modified Gilson option,

TABLE II

SUMMARY OF RAIL COST ASSUMPTIONS

Sets of Grain Rail Cost Estimates	Underlying Assumptions
I - Low Costs	- inflation in volume-related costs, net of productivity, of 7% per year to 1985-86 and 5% per year thereafter; - fixed volumes of 31.0 million tonnes per year; - 21% cost of capital; - no return to the railways on the branchline rehabilitation assets;
II - High Costs	- inflation in volume-related costs, net of productivity, of 12, 11, 10, 9% ...; - volumes increasing from 31.0 million tonnes in 1981-82 to 39.4 million tonnes in 1990-91; - 25.4 % cost of capital; - including an estimated return on the branchline rehabilitation assets;
III - Medium Costs	- inflation in volume-related costs, net of productivity, of 9% per year; - volumes increasing from 31.0 to 39.4 million tonnes over the period 1981-82 to 1990-91; - 21% cost of capital; - no return to the railways on the branchline rehabilitation assets;

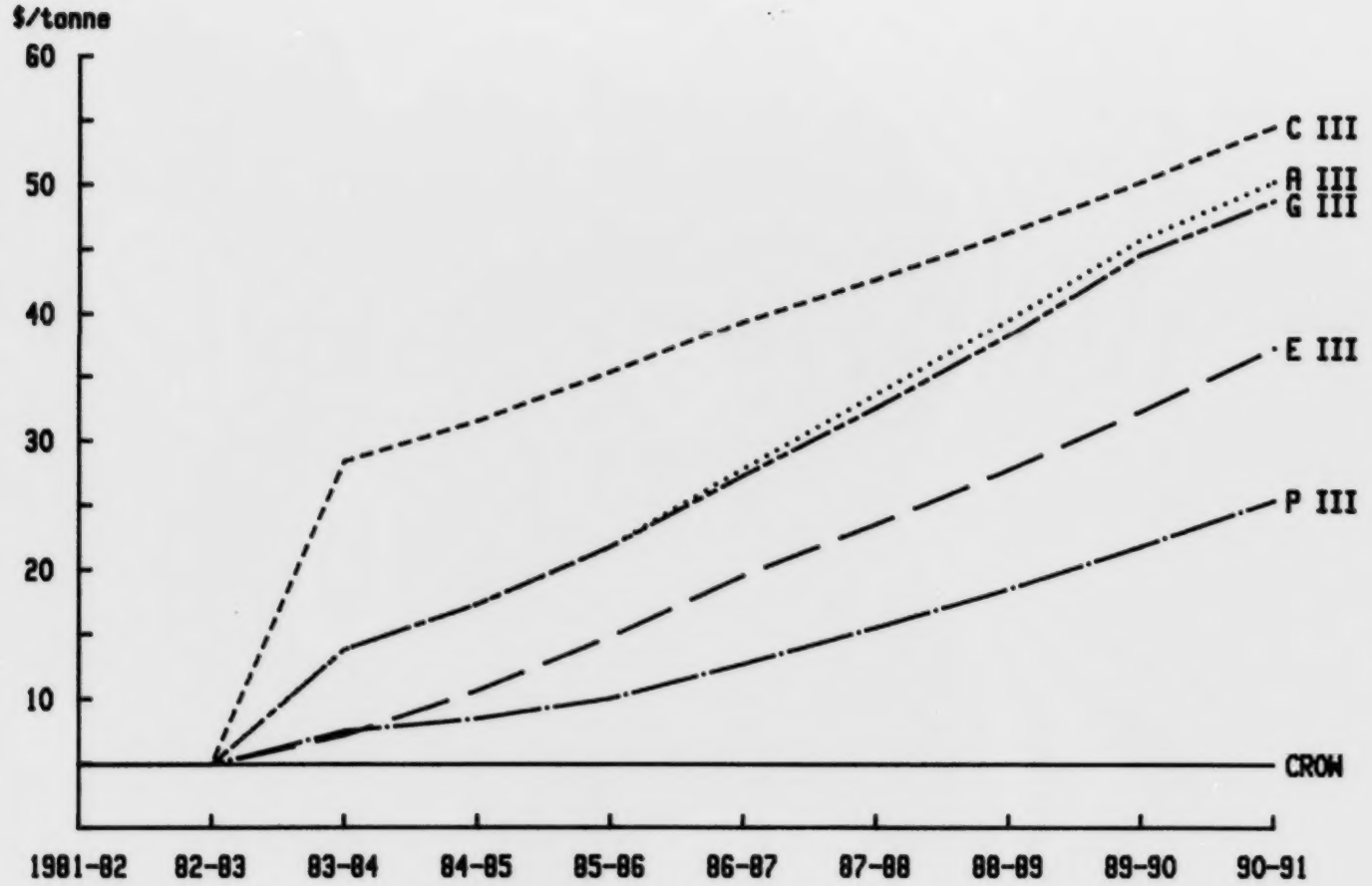
TABLE III

AGRICULTURAL IMPACT SCENARIOS

	Methods of Payment / Cost Sharing			
	Gilson (G)	Alternative to Gilson (A)	Payment to Railways (E)	Pool Proposal (P
Rail Costs I,II,III and Types of Impacts Estimated	-as per Gilson Report	-assumes Gilson up to 1985-86 but producers pick up all volume and inflation thereafter	-1981-82 gross R.R. shortfall paid to R.R. and producers pay for all volume and inflation	-assumes Gilson's cost sharing proposals
I. Low Rail Costs - Real Final Product (RPA) Impacts	Impact (GI) and compensatory rate (CI) estimates measured from no Crow change base case	None	None	None
II. High Rail Costs - Real Final Product (RFP) Impacts	Impact (GII) and compensatory rate (CII) estimates measured from no Crow change base	None	None	None
III. Medium Rail Costs - Real Final Product (RFP) Impacts - Farm Income Impacts	Impact (GIII) and compensation rate (CIII) estimates measured from no Crow change base	Impact (AIII) estimates measured from no Crow change base. Compensatory rate estimates = CIII	Impact (EIII) estimates measured from no Crow change base. Compensatory rate estimates = CIII	Impact (PIII) estimates measured from no Crow change base. Compensatory rate estimate = CIII

Note: The compensatory rate estimates CI, CII and CIII indicate the maximum possible impacts from Crow change for the respective sets of low, high and medium rail cost assumptions. These estimates assume that producers pay the full compensatory rail rates, beginning in 1983-84 and for each subsequent year thereafter.

GRAPH 2 - FREIGHT RATES BY POLICY OPTION UNDER MEDIUM RAIL COSTS



SOURCE: APPENDIX IV

will be the same as under GIII up to 1985-86 but will be higher in subsequent years because producers will be paying for all of volume and inflation costs after 1985-86. Rates under the EIII proposal will be much lower than either the AIII or GIII rates; however, at some time beyond 1990-91, EIII rates could surpass the GIII rates if cost increases continue. Producers would be paying for all cost increases under EIII and only some of the future cost increases under GIII. It is worthwhile noting that with 9% annual inflation and no volume increases after 1990-91, this cross-over effect will only occur well into the 21st century. Rates under the EIII proposal will never reach the level of rates under AIII because producers will be paying for all volume increases in both cases. Finally, the freight rates under PIII, the Pools'proposal, will rise the most slowly of all the policy options, reaching only about 50% of the GIII rate in 1990-91.

c) Grain and Livestock Price Projections

Grain and livestock prices were projected to 1990-91 based closely on the price projections contained in Harvey[25]. The hog and beef prices as well as the Thunder Bay wheat price assume Harvey's annual percentage changes but were recalibrated to 1981-82 prices. The 1990-91 Thunder Bay barley price is a composite projection based on Harvey's barley/wheat relative price and the trend line projection of the 1990-91 barley price. Other port grain prices were derived on the basis of historical price relatives. Hog and beef prices in 1990-91 were estimated to be $173 and $156 per cwt. respectively while the corresponding port prices for wheat, barley, rapeseed, oats, rye and flaxseed were $465, $367, $540, $269, $343 and $650 per tonne respectively. Appendix III contains more complete details on these estimates, including farmgate prices by option, and how they were derived.

Elevator handling costs per tonne for 1981-82 were taken from Harvey[26] and were projected to 1990-91 by inflating by 10% per year to 1985-86 and 8.5% beyond. Estimated farmgate prices in 1990-91, which were part of the input data used to estimate the farm income impacts, were calculated as port grain prices minus handling costs minus the relevant freight rates. Table IV contains the estimated freight rates plus handling costs in 1990-91 for all rail cost and policy options including the Crow.

TABLE IV

Freight Rates and Handling Costs by Impact Scenario 1990-91

- $ per tonne -

Impact Scenario Under Medium Rail Costs	Freight Rates	Elevator Handling Costs	Total Freight plus Handling Costs
Crow	4.89	34.57	39.46
GI	38.35	"	72.92
CI	43.88	"	78.45
GII	53.38	"	87.95
CII	59.78	"	94.35
GIII	48.76	"	83.33
CIII	54.53	"	89.10
AIII	50.23	"	84.80
EIII	37.22	"	71.79
PIII	25.39	34.57	59.96

Source: Appendix IV.

CHAPTER IV

REAL FINAL PRODUCT (RFP) IMPACTS IN 1990-91

1. Western Canada

The estimated RFP impacts in western Canada have been summarized in Table V by impact scenario, agricultural sector and province/region. It should be noted that these data are in 1990 million dollars. (Assuming an annual inflation rate of 10% to 1985/86 and 8.5% beyond, then a dollar in 1990 would be worth less than 50 cents in 1982.) The complete set of RFP impacts are contained in Tables IV-3 to IV-11, Appendix IV, which also indicates how the impacts were estimated.

a) Grain Impacts

The grain sector impacts measure the change in the gross value of grain exports - valued at export prices and therefore including returns to the handling and transport system - as a result of different assumptions about rail costs and policy options. They were calculated as the increase in the gross value of grain production from the removal of the transportation constraint minus increased feed use on the Prairies minus the fall in production due to the estimated decline in seeded acreage, from the level that would occur if somehow the rail capacity could be expanded without a change in Crow, minus the increase in seed use. The acreage-production decrease comes about due to lower farmgate prices once Crow is revised. Because of the change in relative prices, wheat and rapeseed acreage and production have been estimated to increase across the Prairies, but this has been more than offset by a decline in barley acreage and production. The change in the RFP value of grain is positive for all options except GI and CI where it is assumed that there will be constant production and hence constant rail movement to 1990-91 even though there will be no delivery constraint. The value of increased Prairie grain production, estimated to be worth $3,213 million in 1990-91 as a result of removing the transport constraint, is the same for all options GII through PIII; hence, differences between the grain sector impacts reflect for the most part different volumes of grain diverted from the export to the Prairie market as well as the acreage-production response variations across options. In general, the more closely the estimated freight rate is to the compensatory rate over the period to 1990-91, then the smaller will be the increase in the value of grain exports (or the smaller will be the decrease in the value of the grain exports for scenarios GI and CI). In the case of the medium rail cost options GIII - PIII, the exception is PIII where the estimated feed diversion is substantial enough, due to the livestock payments and associated expansion in livestock production,

TABLE V

REAL FINAL PRODUCT IMPACTS OF CROW CHANGE IN WESTERN CANADA BY SCENARIO AND AGRICULTURE SECTOR WITHIN PROVINCE/REGION
- $ million in 1990-91 -

	Policy Option/ Sector	Manitoba	Saskatchewan	Alberta/BC	Western Canada
GI	grain	-116.5	1.5	-448.5	- 563.5
	hogs	92.9	40.3	176.5	309.7
	beef	71.7	60.2	416.0	547.9
	processing				273.3
CI	grain	-155.5	- 3.6	-615.6	- 774.7
	hogs	121.8	52.8	213.4	406.0
	beef	112.3	95.0	656.7	864.0
	processing				388.5
GII	grain	337.8	1,917.1	224.6	2,479.5
	hogs	127.0	55.0	241.3	423.3
	beef	95.5	80.8	558.3	734.6
	processing				411.7
CII	grain	293.9	1,906.6	- 6.6	2,193.9
	hogs	158.9	68.8	301.9	529.6
	beef	140.5	118.9	821.4	1,080.8
	processing				539.3
GIII	grain	353.8	1,923.2	241.0	2,518.0
	hogs	114.3	49.5	217.2	381.0
	beef	86.1	72.8	503.1	662.0
	processing				378.2
CIII	grain	313.9	1,902.8	74.6	1,291.3
	hogs	143.6	62.2	273.0	478.8
	beef	127.6	108.0	746.2	981.8
	processing				494.5
AIII	grain	349.1	1,920.5	224.8	2,494.4
	hogs	118.1	51.2	224.2	393.5
	beef	88.2	74.6	515.5	678.3
	processing				386.7
EIII	grain	402.7	1,898.5	451.2	2,752.4
	hogs	78.1	33.8	148.4	260.3
	beef	55.7	47.2	325.9	428.8
	processing				270.1
PIII	grain	362.5	1,865.9	253.8	2,482.2
	hogs	124.4	53.9	236.4	414.7
	beef	109.0	92.2	636.9	838.1
	processing				402.7

Note: Grain includes increases in production from removing the transport constraint minus the production response from decreased acreage minus increased seed use minus changes in feed use.

Source: Appendix IV.

to imply less of an increase in grain exports even though the PIII freight rate is estimated to be the lowest of any option involving a change in Crow over the entire period.

It is apparent from Table V that the grain sector impacts will be felt most strongly in Saskatchewan. In the case of options GI and CI, which do not involve any increased production from removal of the transport constraint, it is estimated that the value of RFP grain exports emanating from Saskatchewn will be nearly unchanged. This compares most favourably to the large negative grain estimates in Alberta/British Columbia and, to a lesser extent, in Manitoba. Two reasons account for this. First, estimated livestock expansion in Saskatchewan will not match what will occur in Manitoba and Alberta/British Columbia with the result that there will be less Saskatchewan grain diverted from the export to the domestic market. Second, there will be a relatively greater increase in wheat and rapeseed production and a relatively smaller decline in barley production in Saskatchewan, based on existing production patterns. This implies that the value of the crop mix moved from Saskatchewan to export points will be less sensitive to freight rate changes than what will likely occur in the rest of the Prairies.

After allowing for increased grain production in options GII through PIII, it is clear that the estimated value of grain exports from Saskatchewan shows the largest increase. In addition, these estimates appear to be the most stable between the various policy options when compared with the estimates for Manitoba and Alberta/British Columbia. This would appear to reflect both the smaller grain diversion to the local market as well as the relatively greater increase in wheat and rapeseed production.

b) Livestock Impacts

The value of the RFP livestock impacts were based on Toronto livestock prices and hence include a measure of transport costs. The decrease in farmgate prices of statutory grain that will result from Crow change, relative to what would have occurred without Crow reform, will lead to an expansion in western livestock output. With the exception of the PIII estimates, this expansion will be larger the closer the freight rate is to the compensatory rate over the period to 1990-91. In the case of the PIII estimates, the large increase in livestock output relative to other scenario III policy options is the result of the annual livestock payments. It is interesting to note in comparing the GI and CI impacts with the other scenarios that the livestock estimates are relatively invariant to whether grain production expands to meet projected export targets or remains constant over

the period. In the case of the policy options GIII to PIII, the gain in livestock production under EIII would amount to about $689 million, or only about two-thirds of the gain under the Gilson option GIII. The 'Pools' option, PIII, would increase the RFP livestock output by 20% more than under GIII.

The province/region impacts were pro-rated on the basis of FGPR estimated 1990-91 hog and beef output proportions respectively; therefore, the livestock impacts in each province/region are a constant proportion of the total hog and beef impacts in western Canada. This procedure can be justified on the grounds that however the Crow is revised, the current structure of these rates would not likely change significantly over the decade, implying that the 1990-91 spread in farmgate prices between provinces would remain substantially as it is now. Hence, Manitoba would gain about 30% of the projected increases in hog production under all scenarios, Saskatchewan about 13% and Alberta/B.C. 57%, with most of this 57% accruing to Alberta. In terms of the projected increases in beef production, over three-quarters would occur in Alberta/B.C. with Alberta again seeing most of the gain relative to B.C., Manitoba would stand to gain about 13% of projected increases in beef output across all scenarios while about 11% would accrue to Saskatchewan.

Interpreting the FGPR 1990-91 livestock production estimates as the base case of no Crow change, Table VI gives the percentage increases in hog and beef output for the policy options GIII to PIII. As expected, the immediate move to compensatory freight rates, option CIII, would produce the largest gain in both hog and beef output in the west, about 43% and 32% respectively. Under the Gilson option, GIII, hog and beef output would expand by about one-third and one-fifth respectively while the percentage changes under EIII, the majority Eastern proposal, would be the lowest at 23% for hogs and 14% for beef.

c) Agricultural Processing Impacts

The estimated value-added increased in western agricultural processing, which includes rapeseed crushing, meat packing and feed milling, also tend to vary across scenarios in the same manner as the grain and livestock estimates. The PIII increase in value-added processing output is likely an underestimate because the proposal to put all products under Crow could not be easily pro-rated back to the 1990-91 estimate of value-added per tonne; hence, the estimate reflects mainly the large increase in western meat packing as a result of the significant increase in livestock production under this option. Offsetting this underestimate is that the additional

TABLE VI

PERCENTAGE CHANGES IN WESTERN LIVESTOCK PRODUCTION BY POLICY OPTION 1990-91

- % -

Policy Option	Hog Production	Beef Production
GIII	33.8	21.4
CIII	42.7	31.9
AIII	34.9	21.9
EIII	23.0	13.8
PIII	36.9	27.2

tonnages that will be moved in 1990-91 at the PIII freight rate will increase rail costs and this has not been accounted for because it is unclear what these tonnages might be. This would depend on the supply response in special crops to the PIII proposal to remove the Crow distortion.

It was not possible to break the processing impacts out by province/region. Much of the basic data used to generated these effects were taken from Statistics Canada sources and, due to confidentiality requirements, were not available on a more disaggregated level across the west.

2. Eastern Canada

The estimated RFP impacts in eastern Canada have been summarized in Table VII. The four Atlantic provinces were grouped together with the estimates presented for the region as a whole. Again, the estimates are in 1990 million dollars with more complete details given in Appendix IV.

a) Grain Impacts

The grain impacts represent decreased feed use only. Because the prices of statutory grain east of Thunder Bay will be unaffected by Crow-change, there will be no other impact on grain production in eastern Canada. The grain impacts have been shown as positive because slightly reduced livestock production will decrease the demand for feed relative to what it otherwise would have been. On the basis of the current level of self-sufficiency in eastern grain production, this would likely mean reduced grain imports into the region. With grain production forecast to increase substantially in Quebec and the Atlantic provinces by 1990-91, however, this may mean a larger grain export from the region if the surplus in Ontario is large enough to offset the remaining import needs of Quebec and the Atlantic provinces.

As would be expected, the larger the western livestock production response to Crow change, the greater will be the RFP impact on grain in the east. Across all scenarios and policy options, however, it is clear that the grain impacts are very slight, with the EIII option the lowest at $8.1 million. The province/region estimates were derived on the basis of FGPR forecasts of provincial livestock production, and hence feed usage, in 1990-91. The RFP grain impact in Ontario will be the largest in the east at $7.9 million as a result.

b) Livestock Impacts

The effects of Crow reform on livestock production in eastern Canada will be indirect. Increased hog and beef output on the Prairies will increase total North American supplies and thereby have a slight depressing effect on livestock prices and production in eastern Canada.

Under policy options GIII to PIII, the maximum impact on hog production would result if the Crow were changed to compensatory rates beginning in 1983/84. The majority eastern proposal, EIII, would produce the smallest impact, amounting to about $7.5 million, with the Gilson option being slightly larger at nearly $13 million. The impact on Quebec would be only marginally higher than on Ontario under all options while the impact on Atlantic Canada would be, for all intents and purposes, virtually insignificant.

The negative impacts on eastern beef production would follow the same general pattern as the hog estimates. The impact for Ontario would be stronger because of the much larger cattle feeding sector in that province relative to Quebec and the Atlantic region. It should be noted, however, that the negative beef impacts are an overestimate because they do not include the positive effects that would accrue to the cow-calf sector from a change in the statutory freight rates.

In order to put the negative livestock impacts into context, Table VIII shows the percentage price and output changes for both the eastern hog and beef sectors in 1990/91, measured against what would have been the case if the Crow were maintained, under policy options GIII to PIII. The percentage price changes are in Index 100 Toronto hog prices and A1/A2 steer prices while the FGPR livestock estimates in 1990/91 have been interpreted as the no-Crow change base case. Excluding the CIII option, the depressing effects on eastern hog prices would be about 0.5% to 1% under the other policy options, while the negative effects on hog output would be even smaller, ranging from 0.25% under EIII to nearly 0.6% under the Pools' option. The percentage reductions in beef prices, again excluding the CIII option, would range from about 0.6% to 1.6% under the EIII and PIII options respectively, while the corresponding effects on beef output would be in the range of 0.6% to 1.1%[27].

c) Agricultural Processing Impacts

Based on the qualitative analysis of Chapter II, measurement of the effects of Crow change on eastern agricultural processing was confined to the amount of canola that might be diverted from eastern to western

TABLE VII

REAL FINAL PRODUCT IMPACTS OF CROW CHANGE IN EASTERN CANADA BY SCENARIO AND AGRICULTURE SECTOR WITHIN PROVINCE/REGION
- $ million in 1990-91 -

	Policy Option/ Sector	Atlantic Region	Quebec	Ontario	Eastern Canada
GI	grain	0.5	3.6	6.5	10.6
	hogs	- 0.6	- 5.1	- 5.0	- 10.7
	beef	- 0.9	- 3.7	-11.7	- 16.3
	processing				- 23.9
CI	grain	0.8	5.7	10.0	16.5
	hogs	- 0.8	- 8.4	- 8.2	- 17.4
	beef	- 1.2	- 5.5	-17.3	- 24.0
	processing				- 23.9
GII	grain	0.8	5.3	9.0	15.1
	hogs	- 0.7	- 6.9	- 6.7	- 14.3
	beef	- 1.0	- 4.9	-15.3	- 21.2
	processing				- 23.9
CII	grain	1.0	7.2	12.4	20.6
	hogs	- 1.1	-10.5	-10.3	- 21.9
	beef	- 1.5	- 6.7	-21.0	- 29.2
	processing				- 23.9
GIII	grain	0.5	4.4	7.8	12.7
	hogs	- 0.6	- 6.2	- 6.1	- 12.9
	beef	- 1.0	- 4.4	-13.9	- 19.3
	processing				- 23.9
CIII	grain	0.9	6.5	11.3	18.7
	hogs	- 0.9	- 9.5	- 9.3	- 19.7
	beef	- 1.4	- 6.2	-19.5	- 27.1
	processing				- 23.9
AIII	grain	0.7	4.4	7.9	13.0
	hogs	- 0.6	- 6.4	- 6.3	- 13.3
	beef	- 1.0	- 4.5	-14.2	- 19.7
	processing				- 23.9
EIII	grain	0.3	2.7	5.1	8.1
	hogs	- 0.4	- 3.6	- 3.5	- 7.5
	beef	- 0.7	- 3.1	- 9.6	- 13.4
	processing				- 23.9
PIII	grain	0.8	5.5	9.6	15.9
	hogs	- 0.9	- 8.1	- 7.9	- 16.9
	beef	- 1.1	- 5.3	-16.5	- 22.9
	processing				- 23.9

Note: Grain covers the changes in feed use.

Source: Appendix IV.

TABLE VIII

PERCENTAGE CHANGES IN EASTERN LIVESTOCK PRICES AND PRODUCTION BY POLICY OPTION IN 1990-91

- % -

Policy Option	Hog Prices	Hog Production	Beef Prices	Beef Production
GIII	- 0.87	- 0.43	- 1.07	- 0.92
CIII	- 1.35	- 0.66	- 1.90	- 1.31
AIII	- 0.87	- 0.44	- 1.08	- 0.95
EIII	- 0.54	- 0.25	- 0.63	- 0.64
PIII	- 1.05	- 0.56	- 1.58	- 1.10

crushers. In estimating the 1990/91 RFP impact of Crow reform on the western crushing industry, it was assumed that there would be a 25% increase on the current amount of canola crushed on the Prairies, regardless of the policy option. It was further assumed that the entire 25%, amounting to about 216,000 tonnes, would be diverted from the total amount of canola crushed in the east by the end of the decade. The value of this diversion from east to west was estimated at $23.9 million in 1990/91, as given in Table VII.

3. Total Domestic Effects

Table IX provides a summary of the total RFP impacts by region and for Canada as a whole across all scenarios and policy options. Overall, western Canada could gain over $4 billion in livestock and agricultural output, depending on the policy option for revising the statutory freight rates. On the other hand, the total loss in eastern Canada would amount to between $37 and $52 million. It is clear that the net gains to the total agri-food sector in Canada from Crow reform would be substantial.

Looking at the results of policy options GIII to PIII, the positive impacts in the west and the negative impacts in the east both increase the faster the crow rates are moved towards compensatory levels. It interesting to note, however, that the incremental gain in the west in all cases outweighs the incremental loss in the east. For example, the EIII option would reduce the eastern loss by $4.7 million compared with the GIII option. It would reduce the western gain by nearly $230, resulting in a net loss to the Canadian economy of $225 million.

TABLE IX

SUMMARY OF REGIONAL AND NATIONAL
REAL FINAL PRODUCT IMPACTS

- $ million in 1990-91 -

Policy Option	Western Canada	Eastern Canada	Total Canada
GI	566.8	- 40.3	526.5
CI	883.8	- 48.8	835.0
GII	4,049.1	- 44.3	4,004.8
CII	4,343.6	- 54.4	4,289.2
GIII	3,939.2	- 43.4	3,895.8
CIII	4,246.4	- 52.0	4,194.4
AIII	3,952.9	- 43.9	3,909.0
EIII	3,711.6	- 36.7	3,674.9
PIII	4,137.7	- 47.8	4,089.2

Source: Appendix IV.

CHAPTER V
FARM INCOME IMPACTS IN 1990-91

Under the status quo situation of no-Crow change, as given by the base case budgets in Tables V-1 to V-7 in Appendix V, realized net farm income in 1990-91 is expected to be about $6.4 billion in Canada, about 48 percent above the 1981 level of $4.3 billion. Regionally, the increases in realized net farm income for the period 1981 to 1990 are expected to be about 47 percent for the eastern region and about 50 percent for the western region. These rates of increase are much lower than the period between 1971 and 1981 for which the increases were 240 percent and 271 percent respectively. The slowdown in the growth rate of realized net farm income in the base case for the western region results from the expected railway transportation constraint. A complete description of the methodology used to produce these income impacts is contained in Appendix V along with the detailed estimates and limitations of these data.

1. Western Canada

While the alternatives to keeping the Crow rates will lower Prairie farmgate grain prices, this does not necessarily imply that total grain receipts will be lower. Once the transportation constraint has been removed, more production and deliveries of grain will be possible and, therefore, grain receipts will likely be higher depending upon the decrease in farmgate grain prices. Furthermore, the effects of lower farmgate grain prices will spur increased livestock production in the west, and this will be reflected in increased livestock receipts for the region. Tables X and XI contain the aggregate and per farm western net farm income impacts respectively, by province/region and farm type. Farms have been classified on the basis of sales of a given commodity being 51% or more of total sales. Three farm types have been used in this analysis. Grain and oilseed farms include wheat, coarse grains, oilseeds and mixed grains enterprises. Livestock farms include cattle and calves, hogs, mixed livestock, poultry and dairy farms. The category "all farms" include livestock and grain and oilseeds farms as well as all other farms. Appendix V contains further details.

For the category "all farms" in western Canada, the PIII option will increase realized net farm income by about $1.5 billion as compared with the increase of $992 million under the GIII option. Once compensation is taken into account, however, the GIII option will give the larger increase in income, second only to the CIII option. The EIII option will increase total western net farm income by the same amount as the GIII option before compensation is taken into account in the latter option.

For all farms on a province/region basis, Alberta/B.C. will experience the largest increase in aggregate net farm income

TABLE X

AGGREGATE WESTERN NET FARM INCOME IMPACTS OF CROW CHANGE BY PROVINCE/REGION IN 1990

- $ Million in 1990 -

Impacts by Policy Option	Manitoba			Saskatchewan			Alberta/B.C.			Western Canada		
	Grains + Oilseeds Farms	Livestock Farms	All Farms	Grains + Oilseeds Farms	Livestock Farms	All Farms	Grains + Oilseeds Farms	Livestock Farms	All Farms	Grains + Oilseeds Farms	Livestock Farms	All Farms
GIII:												
Change in Net Income	- 5	86	79	308	68	383	5	430	530	308	547	992
Change after Compensation	89	120	225	745	106	871	210	533	859	1044	759	1955
CIII:												
Change in Net Income	- 32	124	90	265	112	388	- 61	606	634	172	779	1112
Change after Compensation	64	158	236	702	150	876	144	709	963	910	1017	2075
AIII:												
Change in Net Income	- 11	90	78	291	70	368	- 8	446	530	272	565	976
Change after Compensation	59	115	187	617	98	732	146	523	775	822	736	1694
EIII:												
Change in Net Income	10	27	97	284	31	418	98	276	476	392	310	991
Change after Compensation	10	27	97	284	31	418	98	276	476	392	310	991
PIII:												
Change in Net Income	48	100	148	535	87	632	145	514	759	728	646	1539
Change after Compensation	51	122	173	549	102	661	156	604	860	756	828	1694

Source: Tables V-1 to V-5, Appendix V.

TABLE XI

WESTERN NET FARM INCOME IMPACTS OF CROW CHANGE PER FARM
BY PROVINCE/REGION IN 1990

- $ 1990 -

Impacts by Policy Option	Manitoba			Saskatchewan			Alberta/B.C.			Western Canada		
	Grains + Oilseeds Farms	Livestock Farms	All Farms	Grains + Oilseeds Farms	Livestock Farms	All Farms	Grains + Oilseeds Farms	Livestock Farms	All Farms	Grains + Oilseeds Farms	Livestock Farms	All Farms
GIII:												
Change in Net Income	- 339	8342	2719	5476	7052	5579	177	11164	6907	3102	9355	5687
Change after Compensation	6031	11640	7743	13245	10992	12688	7423	13838	11195	10515	12981	12207
CIII:												
Change in Net Income	-2169	12028	3097	4711	11615	5652	-2156	15733	8262	1732	13323	6375
Change after Compensation	4337	15326	8121	12481	15555	12761	5090	18407	12555	9165	17394	11895
AIII:												
Change in Net Income	- 745	8730	2684	5174	7259	5361	- 283	11579	6907	2739	9663	5595
Change after Compensation	3998	11155	6435	10970	10163	10664	5161	13578	10100	8279	12588	9711
EIII:												
Change in Net Income	678	2619	3338	5049	3215	6089	3464	7166	6203	3948	5302	5681
Change after Compensation	678	2619	3338	5049	3215	6089	3464	7166	6203	3948	5302	5681
PIII:												
Change in Net Income	3253	9700	5093	9512	9022	9207	5126	13345	9891	7332	11049	8823
Change after Compensation	3456	11834	5953	9761	10578	9629	5515	15681	11208	7614	14161	9711

Source: Tables V-1 to V-5, Appendix V.

for all options before accounting for compensation, ranging from $476 million under EIII to $759 million under PIII. Moreover, it will also gain the most for all options except GIII after including compensation. Saskatchewan will derive the largest gain under the GIII option after compensation, amounting to $871 million, and will gain nearly as much as Alberta/B.C. under the other options.

Aggregate net farm incomes will increase in Saskatchewan across all options for both livestock and grains and oilseeds farms as well as for all farms combined. In particular, grains and oilseeds farms will be the biggest gainers, reflecting the relative importance of grain and oilseed production in that province. They will gain about 83% of the aggregate increase in net income including compensation under CIII and over 90% under option EIII. The explanation of the latter increase is that freight rates on moving statutory grain will be lower than rates under the other options with the exception of PIII. In the latter option, however, livestock farms will gain relative to option EIII due to compensation being paid to livestock producers.

Grains and oilseeds farms will, in aggregate, fare less favourably than livestock farms in Manitoba and Alberta/B.C., reflecting the relative importance of the livestock sector in these provinces. Excluding option EIII, livestock farms in Manitoba will capture from 53% to over 70% of the increase in total net farm income including compensation. In the case of EIII, however, only 28% of the increase in income will accrue to Manitoba's livestock farms. Livestock farms in Alberta/B.C. will do even better than in Manitoba, picking up 58% of the total income gain under option EIII to nearly 75% under CIII.

On a per farm basis, livestock farms in Alberta/B.C. will gain the most over all farm types across the Prairies once compensation is included. Grains plus oilseeds farms in Saskatchewan will fare nearly as well and much better than similar farms in Manitoba and Alberta/B.C. Livestock farms in Manitoba and Saskatchewan will experience similar gains in income after including compensation.

2. Eastern Canada

By 1990, realized net farm income, on both an aggregate and a per farm basis, will be slightly lower for the eastern region compared to the base case of no-Crow change. Table XII contains both sets of impacts. The reduction in realized net farm income in the eastern region ranges from -$12 million for the EIII option to -$36 million for the CIII option. It is interesting to note that the PIII option leads to almost as great a negative impact as does the CIII option.

TABLE XII

AGGREGATE AND PER FARM EASTERN NET FARM INCOME IMPACTS OF CROW CHANGE BY PROVINCE/REGION IN 1990

- $ and $ million in 1990 -

Impacts by Policy Option	Atlantic Provinces	Quebec	Ontario	Eastern Canada
GIII Change in Net Income:				
Aggregate	- 2	- 8	- 10	- 20
Per Farm ($)	- 153	- 161	- 122	- 138
CIII Change in Net Income:				
Aggregate	- 3	- 13	- 20	- 36
Per Farm ($)	- 229	- 262	- 244	- 248
AIII Change in Net Income:				
Aggregate	- 2	- 11	- 10	- 23
Per Farm ($)	- 153	- 222	- 131	- 159
EIII Change in Net Income:				
Aggregate	- 1	- 5	- 6	- 12
Per Farm ($)	- 76	- 101	- 76	- 83
PIII Change in Net Income:				
Aggregate	- 2	- 12	- 20	- 34
Per Farm ($)	- 153	- 242	- 244	- 234

Source: Tables V-5 and V-6, Appendix V.

On a province/region basis, Ontario is projected to experience the largest impact for all options except AIII where the impact in Quebec will be slightly higher. The hog sector in Ontario will be just marginally smaller than in Quebec by 1990-91; however, the beef sector will remain significantly larger over the decade. This is reflected in the base livestock receipts estimates for 1990-91 for both Ontario and Quebec. The negative impact in the Atlantic region is estimated to be the lowest in eastern Canada and appears to be relatively insignificant.

On a per farm basis, the impact on Quebec will be slightly higher than in Ontario or the Atlantic region . The projected impact of Crow change in Quebec ranges from a low of -$101 per farm under the EIII option to a high of -$262 per farm under the CIII option. Policy option PIII gives the second highest per farm impact in both Quebec and the Atlantic region and the highest impact, along with CIII, in Ontario.

While the farm income impacts in eastern Canada appear to be not insignificant, it is important to remember that the data are in 1990 dollars. The largest per farm impact of -$262 would be worth less than half this amount if the data were measured in constant 1982 dollars.

3. Total Domestic Impacts

Table XIII summarizes the regional and national aggregate net farm income impacts in 1990-91, including compensation, for all farms across the various policy options. The farm community in western Canada stands to gain significantly in terms of net farm income as a result of Crow change, ranging from just under $1 billion under the majority eastern proposal EIII to nearly $2 billion under the Gilson option GIII. The modified Gilson option and the Pools' proposal would seem to produce the same effect on total net farm income. On the other hand, the estimated impacts on net farm incomes in eastern Canada will be slightly negative relative to the base case of no change in the statutory freight rates. The gain in net farm income for Canada as a whole, then, will be only marginally less than that for western Canada due to the minor impacts in the east.

It is also possible to provide a rough indication of the aggregate net farm income impacts excluding the total amount of government compensation paid both to the railways and the producers under policy options GIII to EIII. Subtracting these amounts, as given in Tables II-3, II-4, II-5 and II-7 respectively, from the data in Table XIII gives the net farm impacts excluding compensation, as per Table XIV[28]. It is clear that, even in the absence of compensation, net farm income in the west will grow substantially, ranging from an increase of $309 million under option EIII to over $800 million for options CIII and AIII. The Gilson proposal, GIII,

TABLE XIII

SUMMARY OF REGIONAL AND NATIONAL AGGREGATE
NET FARM INCOME IMPACTS INCLUDING COMPENSATION

- $ million in 1990-91 -

Policy Option	Western Canada	Eastern Canada	Total Canada
GIII	1,955	- 20	1,935
CIII	2,075	- 36	2,039
AIII	1,694	- 23	1,671
EIII	991	- 12	979
PIII	1,694	- 34	1,660

Source: Appendix V.

TABLE XIV

SUMMARY OF REGIONAL AND NATIONAL AGGREGATE
NET FARM INCOME INPACTS EXCLUDING COMPENSATION
- $ million in 1990-91 -

Policy Option	Western Canada	Eastern Canada	Total Canada
GIII	766	- 20	746
CIII	836	- 36	850
AIII	807	- 23	784
EIII	309	- 12	297
PIII	386	- 34	386

would increase western net farm income by over $765 million if compensation payments are excluded. Comparing the EIII proposal with the GIII option, the gain in net farm income for all of Canada will be nearly $450 million higher under the latter proposal. Put another way, the attempt to reduce the loss in eastern Canada by $8 million by adopting the EIII rather than the GIII option will "cost" western Canada, and hence Canada as a whole, about $450 million in net farm income.

CHAPTER VI

ASSESSMENT AND OBSERVATIONS

The purpose of this chapter is twofold. First, the empirical results will be assessed, both from the standpoint of how robust the estimates are, given the methodology that was used to generate them, and how the estimates should be interpreted as a consequence. Second, in light of some of the concerns that have been expressed about the assumptions underlying the analysis, the sensitivity of the estimates will be assessed under other assumptions, including a qualitative assessment of how realistic these other assumptions may be compared with those that were used for this study.

1. Assessment of the Estimated Impacts

As noted in Chapter I, the empirical estimates from this analysis should be judged important if they are large and insignificant if they are small, both because of constraints inherent in the methodology and because of the obvious dangers involved in forecasting over the long run.

a) Grain Production Estimates

Increased Prairie grain production attributed to the planned rail capacity expansion should be viewed as "ballpark" estimates only. The assumptions on which these estimates were based imply a fairly simple view of a complex problem. In the absence of Crow change and with no additional government expenditures other than what would be projected from current programs, it seems reasonable to assume a fixed amount of grain moving off the Prairies by rail. Any increase in the eastward movement of grain as a result of the capacity constraint could easily be offset by a reduction in the westward movement as other bulk commodity traffic increases. The question is whether or not production might still increase above the level that is currently consistent with a rail movement of 31.0 million tonnes. Grain could be trucked to west coast ports, particularly from Alberta, implying that production somewhat above this level might happen. A more serious problem in attempting to estimate the grain production impacts under the base case scenario is that more grain would likely be marketed locally, thereby breaking the link between farmgate prices for grain used locally and export prices. This would, of course, have implications for livestock production on the Prairies and in eastern Canada as well.

It would take a more sophisticated analysis than was conducted for this study to incorporate these implications. In particular, some additional assumptions would have to be made about both railway and government

policies towards moving grain if mainline traffic rationing did occur. Moreover, such an analysis would have to be much more dynamic than the current exercise, for it would be necessary to indicate whether mainline capacity in the west might still expand if the Crow rates were left intact, and if so at what rate relative to current railway expansion plans, or whether existing capacity would be left unchanged over the period to 1990/91. Hence, some assumptions would also have to be made about future government expenditures under the no-Crow change scenario. It seems doubtful that the potential gain in accuracy from a more sophisticated analysis would warrant the increased analytical complexity.

b) Livestock Impacts

There are indications that the multipliers used to generate the livestock impacts may underestimate these impacts on some grounds while other considerations would indicate that the multipliers overestimate them.

In the first place, any change in the statutory freight rates, with its concommitant effects on western farmgate grain prices and livestock production, must be viewed differently than the short run changes in grain prices on which the livestock multipliers have been estimated. The supply responses to the long run, certain type of price changes analyzed in this study will likely be greater than the responses to uncertain input price changes normally occurring in the market. All other things being equal, this would indicate that the supply responses implicit in the multipliers are too low, thereby implying that the livestock impacts both west and east have been underestimated[29].

Offsetting this potential understimation is that data from the most recent years did not enter into the estimation of the multipliers. That is, the livestock supply responses to freight rate changes that one would observe in the remainder of this decade may be substantially different from the supply responses that prevailed over the 1970's and that are imbedded in the livestock multipliers. It is likely that structural changes in the Prairie hog sector mean that the responsiveness of supply is over-estimated. The Prairie hog industry has become much more capital intensive in the last decade, indicating that production would likely be less variable with respect to changes in input costs. Moreover, the number of "inners and outers" - those grain farmers who have marketed their grain by raising some livestock during periods of excess grain supplies on the Prairies - will be less in the future because increased rail capacity will improve grain marketing and export delivery opportunities.

It is implicit in the livestock estimates that a given change in western livestock production will produce a given response in hog and beef output in eastern Canada. That is because grain prices in the east will be unaffected by Crow revision, and eastern livestock output changes will only occur as a consequence of increased total North American red meat supplies, thereby slightly reducing livestock prices to all producers due to western expansion. To the extent that expansion in the west has been over-estimated, then the slight negative effects on eastern livestock output, compared with what would otherwise have occurred, will also be over-estimated.

There are additional grounds for believing that the eastern impacts have been overestimated. The livestock multipliers assume the trade flows west to east in meat that were prevalent in the 1970's, even though east-west trade in pork has ceased for all intents and purposes. The depressing effect on eastern hog prices and production will be much less in the future than would be suggested by these multipliers in that eastern Canada, and especially Quebec, is now a net volume exporter of pork. Therefore, hog prices in the east are already at the export floor price. Similarly, rising transport costs in moving beef west to east have narrowed the gap between the import ceiling and export floor prices on eastern cattle. This also will have the effect of reducing the price and, hence, the output response of eastern cattle production as Prairie production increases due to Crow change.

Finally, the estimated impacts in the livestock sector, arising from various options to change the statutory grain rates, are broadly consistent with other analyses which measure the effects of Crow change. For example, despite using a somewhat different set of assumptions, the recently released Executive Summary from the Chase Econometrics study indicates that the Gilson option would reduce the annual rate of growth in eastern hog production from 0.9% to 0.7% over the period 1982 to 1992 whereas the annual growth rate in Prairie hog production would increase from 2.4% to 3.4%. In addition, the annual growth rate in Prairie beef production would increase by 0.6% compared to what it would have been if Crow were left unchanged[30].

c) Agricultural Processing Impacts

The value-added processing estimates for western Canada, especially the canola crushing and meat packing impacts, should be viewed as the maximum effects following Crow reform. In the case of meat packing, it was assumed that all of the projected increases in Prairie livestock production would be processed in the west on the grounds

that moving meat rather than fully fed live animals is more economical. To the extent that some of this increased livestock production may move off the Prairies in live form, then it would reduce the value-added estimates in meat packing.

In the case of canola crushing, not only was it assumed that all increased rapeseed production would be crushed on the Prairies, but that there would be an increase of 25% on the existing crush levels. This latter assumption implies a reduction in exports of seed off the Prairies of about 216,000 tonnes annually. While no attempt was made to estimate the amount of canola that would be crushed in eastern Canada, mainly Ontario, by 1990/91, it was assumed that the entire 216,000 tonne reduction in exports would be at the expense of eastern canola crushing. (Current estimates would indicate that about 250,000 tonnes of canola could be crushed in Ontario in 1983.) This negative impact on the east, therefore, could also be taken as a maximum which could be less if some of the 25% increase on the existing western crush comes at the expense of foreign crushers using Prairie canola seed. In addition, the estimated crushing impacts both east and west are implicitly based on the continuation of minimum compensatory rates (MCRs) for canola products moving east of Thunder Bay, or, at the very least, that a future move to commercial rates would mean only a slight offset to the benefits western crushers would receive on the eastward movement of oil and meal as a result of Crow reform. This will depend on the future status of freight rates on canola products east of Thunder Bay. It is sufficient to point out that any increase in these rates above minimum compensatory rates, assuming that canola oil and meal will not be able to take advantage of low water rates on the Great Lakes, will reduce the estimated gain in western Canada and the estimated loss in eastern Canada.

2. Sensitivity of the Estimates

In projecting over any period, it is necessary to make some assumptions about what may or may not occur in the forecast period. Underlying this analysis is a broad assumption that the current policy and economic environment in agriculture will remain unchanged over the decade. That is, it has been assumed that there will be no supply management in the red meats sector, that there will be no major changes in feed grains policy such as the elimination of Feed Freight Assistance and that trade flows of livestock and meat, especially with the U.S., will not be disrupted.

Some concern was expressed to the Eastern Working Group[31] that the open border assumption with the U.S. may not withstand the test of time if the Crow rates are changed too quickly, for this will mean greater western livestock production, more meat

exports to the U.S., and a higher probability of countervailing U.S. action. This could seriously disrupt the hog industries east and west if such were to happen. In the absence of other export markets, the reduction in pork exports to the U.S. would be diverted to the domestic market, causing producer and retail prices to fall. Depending on the size of the diversion, this could cause significant adjustment problems to hog producers, either until new export markets were found or until domestic production falls accordingly.

Three points are worth keeping in mind in assessing the likelihood of this doomsday scenario with respect to the threat of U.S. trade sanctions from increased pork exports arising from Crow change. In the first place, the U.S. Meat Import Law does not apply to pork. It would, quite literally, take an act of Congress to amend the existing legislation to include pork, and this would give both the government and hog producers a good deal of lead time to minimize the implications for Canada, to find new export markets or, as a last resort, to reduce domestic production. Furthermore, government compensation to producers changes the nature of the existing subsidy which focuses on promoting grain exports to one that is resource neutral, giving little reason for future trade restrictions.

In the second place, the difference in western hog expansion under the Gilson and the majority eastern proposals, GIII and EIII, would be unlikely to, by itself, trigger U.S. countervailing action. This difference could amount to about 58 million lbs. (measured as chilled trimmed carcass) which would be less than 3% of Feed Grain Policy Review estimates of domestic pork production in 1990/91. Moreover, it would represent less than 0.5% of projected U.S. hog production in 1990/91. Given that hog production in the U.S. can vary by as much as 10-15% annually, the differential impact of the Gilson and eastern proposals would be insignificant. It would seem, therefore, that the threat of U.S. trade sanctions could arise equally under either policy option, and in both cases the threat is likely to be minimal.

In the third place, the threat of countervailing trade sanctions always exists when an attempt is made to increase exports. It seems perverse, then, to suggest that exports of pork should be limited, particularly by restraining western production, when there is no solid evidence that countervailing action may result[32].

The question of increased western beef production triggering the U.S. Meat Import Law is also highly problematical. This law, which applies only to processed beef and not live cattle, has been brought into operation only twice, in 1976 and 1982. The reason for its application last year was the result of unusually large herd slaughter in Australia due to drought conditions. The Canadian allocation under this law is so

small relative to the total allocation that expanded western production would, by itself, be unlikely to invoke its operation. It should be noted, however, that should the Meat Import Law be triggered again in the future, then western beef exports to the U.S. would move as live cattle instead of meat[33].

It has been suggested that the grain price projections estimated in this analysis are too optimistic, particularly the 1990/91 barley price, and that the livestock impacts will be unreliable as a consequence. It is correct that more pessimistic grain price forecasts would reduce the estimated grain RFP impacts. The livestock RFP impacts in both eastern and western Canada will, however, be relatively insensitive to lower grain prices. The changes in livestock production will be generated solely by changes in freight rates, and these will be independent of projected grain prices. The value of feed use changes associated with the estimated changes in livestock production will be reduced with lower grain prices and this will reduce the livestock impacts. However, the value of feed use estimates are small in comparison with the value of the estimated livestock output, and the reduction in the livestock impacts from lower grain prices would be relatively minor as a result. What this means is that if Prairie livestock is to increase by the end of the decade for other reasons, then it will increase at a slightly faster rate as a result of Crow change.

The assumption that Canada is a price-taker on world grain markets has been the subject of an on-going debate. In the short run, Canada probably does have some scope for influencing world grain prices through stock manipulation. There is no evidence that the Canadian Wheat Board pursues this kind of policy; in fact, all the available evidence, including CWB statements on this issue, indicate that the domestic goal is to maximize exports. In the longer run, however, it is doubtful if the board has the ability to control supply except through its delivery quotas. It is also unlikely that the Board would be able to restrict Prairie grain exports given that rail capacity and, therefore, delivery opportunities are expected to increase substantially over the decade. Besides, the ability and willingness of grain importing countries to seek alternative sources of supply over the longer term imply that Canada's market power in the longer run would be less than in the short term[34].

Concern was expressed to the Eastern Working Group that compensation payments to western producers, rather than the railways, as an offset to Crow change would amount to an additional subsidy that would upset the regional competitive balance in domestic agriculture[35]. This would hardly be the case, however, as is demonstrated by Table XV which gives the increased freight costs to shippers of statutory grains in 1990/91 before and after compensation payments to producers.

TABLE XV

INCREASING WESTERN FREIGHT COSTS BEFORE AND AFTER PAYMENTS TO PRODUCERS IN 1990-91

- $ million -

Policy Option	Increased Freight Costs Before Compensation	Compensation Paid to Producers	Increased Freight Costs After Compensation
GIII	1,728.6	962.1	766.5
CIII	1,955.7	1,189.2	766.5
AIII	1,786.3	717.5	1,068.8
EIII	1,273.7	-	1,273.7
PIII	807.7	-	807.7

Source: Calculated from Tables II-3 to II-7, Appendix II.

It is clear that producer payments under options GIII, CIII and AIII will not fully compensate for higher freight rates; that is, producers will be bearing an increased proportion of the costs of moving grain, even after compensation has been taken into account. The reason that EIII would give the highest net increase is that government compensation would be capped at about $682 million per year with producers picking up all cost increases associated with both higher volumes shipped as well as inflation.

More particularly, the eastern concern seems to be that higher freight rates will change the spread in feed grain costs between east and west, thereby giving a competitive advantage, or, more properly, reducing the current disadvantage, to the west in livestock production. Paying compensation on top of this change in the regional spread in feed costs will only enhance the impetus to increase western livestock output[36].

It should be noted, however, that annual lump sum compensation payments to producers as recommended by Gilson would not be specific to any particular farm activity. These payments would have no bearing on farm level decision-making, with the exception of the livestock payments under option PIII. Decisions on what and how much to produce are made on the basis of costs and returns to be found in the market place, and lump sum payments will have no effect on these costs and returns[37].

The point is that increased western livestock output will be the result of higher freight rates, regardless of whether compensation is paid to producers or not. For example, suppose that the government did not pay any compensation to producers under option GIII but still increased the freight rates as per that proposal. Livestock output on the Prairies would still increase as much because the impact on Prairie farmgate prices would remain the same.

FOOTNOTES

1. A preliminary version of this report was circulated to interested parties in October 1982. cf. Agriculture Canada (1982), Annex V.

2. Cf. Gilson, J.C. (1982), Chapter II, and Alberta Agriculture, Alberta Economic Development (1980) for a full discussion of the history and current problems in the grain handling and transportation system.

3. This was an in-house estimate prepared by Agriculture Canada.

4. This amounts to Canada being a price-taker in world grain markets. The assumption is discussed briefly at the end of Chapter VI.

5. Horner, Dr. H. (1981), Chapters 7,8.

6. Agriculture Canada, op cit; Part II: Assessment, pages 27-28.

7. Gilson, J.C. (1982), page IV-10.

8. Harvey, D.R. (1982), page 10.

9. Agriculture Canada, op. cit; pages 42-43.

10. ibid; pages 56-58.

11. Government of Canada, (1982c), pages 42-44.

12. ibid; pages 49-52.

13. Canada Grains Council (1982), pages 7-9.

14. Government of Canada (1982b), pages 2-3.

15. Agriculture Canada, op. cit., Part II: Assessment.

16. ibid;

17. This will not, in fact, be the case, for some ways of paying producers would mask the freight rate change and not be reflected in lower farmgate prices as a result. These problems have been ignored for this study.

18. Agriculture Canada, op. cit; pages 22-29.

19. Harvey, D.R. (1980, 1982).

20. Government of Canada (1982a).

21. Gilson, J.C., op. cit; Chapter VI.

22. Agriculture Canada, op. cit; Part I.

23. Prairie Wheat Pools, (1982).

24. Subsequent drafts reduced the 80% to 60% on the grounds that the Prairie livestock industry on the Prairies has benefitted from time to time as a result of marketing/transport constraints driving local prices below world prices minus handling plus transport costs.

25. Harvey, D.R. (1982), Appendix II.

26. ibid;

27. These percentages were based on FGPR domestic livestock forecasts for 1990/91 and a recent U.S. forecast from Chase Econometrics (1982a).

28. The data in Table XIV give only an approximate idea of the net farm income impacts excluding compensation. If no compensation were paid but rates still increased as projected under the policy options, then this would entail on-going railway losses. Moreover, these losses would be higher under those options which entail larger payments to the raiways, such as EIII and PIII. To the extent that rail losses would impact on Prairie grain production under these options via a transport constraint, then the gains to the west would be much less than the estimates for EIII and PIII in Table XIII.

29. Harvey, D.R. (1982), page 11.

30. Chase Econometrics, (1982b).

31. Agriculture Canada, op. cit; Part I.

32. ibid; Part II.

33. ibid; Part II.

34. Harvey, D.R. (1981), pages 19-22.

35. Agriculture Canada, op. cit; Part I.

36. The question of whether payments should be based on cultivated acres, and which cultivated acres should be included, is beyond the scope of this study.

37. Agriculture Canada, op. cit; Part II, page 27.

BIBLIOGRAPHY

1. Agriculture Canada (1982), The Effects of the Western Transportation Initiative on Agriculture in Eastern Canada: Report of the Working Group.

2. Alberta Agriculture, Alberta Economic Development (1980), A Discussion Paper on Current Issues in Grain Handling and Transportation, Government of Alberta.

3. Canada Grains Council (1981), Canadian Grains Industry: Statistical Handbook 81, Winnipeg, Manitoba.

4. Canada Grains Council (1982), Eastern Grain Production and Prospects, given by J.A. Gellner and H.A. Hedley at the Semi-Annual Meetings in Montreal, October, 1982. Winnipeg, Canada.

5. Chase Econometrics (1982a), U.S. Food and Agriculture Long-Term Forecast Report: U.S. Agricultural Economy to 1992, August, 1982.

6. Chase Econometrics (1982b), An Economic Analysis of the Proposed Policy for Revising Statutory Grain Rate Structures: Executive Summary, Canadian Food and Agriculture Service, October 1982.

7. Gilson, J.C., (1982), WESTERN GRAIN TRANSPORTATION: Report on Consultations and Recommendations, Canadian Government Publishing Centre, Supply and Services Canada, Ottawa.

8. Government of Canada, (1982a), The Effect of Transportation Costs on Farm Income and Expenses in Western Canada, Technical Working Paper No. 3 prepared for Dr. J.C. Gilson, Federal Representative on Western Rail Capacity.

9. Government of Canada (1982b), Assessment of Alternative Compensation Mechanisms, Technical Working Paper No. 4 prepared for Dr. J.C. Gilson, Federal Representative on Western Rail Capacity.

10. Government of Canada (1982c), Agricultural Growth Potential for the West With Crow Rate Adjustment, Technical Working Paper No. 5 prepared for Dr. J.C. Gilson, Federal Representative on Western Rail Capacity.

11. Harvey, D.R., (1980), Christmas Turkey or Prairie Vulture: An Economic Analysis of the Crow's Nest Pass Grain Rates, The Institute for Research on Public Policy, Montreal.

12. Harvey, D.R. (1981), Government Intervention and Regulation in the Canadian Grains Industry, Technical Report E/16, Economic Council of Canada, Regulation Reference, June 1981.

13. Harvey, D.R., (1982), An Economic Analysis of the Crow Rates, working paper prepared for Agriculture Canada.

14. Horner, Dr. H. (1981), A review of the Meat Packing Industry in Alberta, prepared for Alberta Economic Development, Government of Alberta.

15. Prairie Wheat Pools, (1982), Western Feed Grain Rate Equalization Fund: An Alternative Method of Payment, prepared jointly by the Saskatchewan Wheat Pool, Alberta Wheat Pool and the Manitoba Pool Elevators.

16. Snavely, King and Associates (1982), 1980 Costs and Revenues Incurred by the Railways in the Transportation of Grain Under Statutory Rates, prepared for the Grain Transportation Directorate, Transport Canada, January 1982.

17. Wogin, G. (1982), Review of Harvey (1980) in Canadian Journal of Economics, Volume XV, No. 3.

APPENDIX I

THEORETICAL ANALYSIS OF THE RFP AGRICULTURAL IMPACTS OF CROW RATE CHANGE

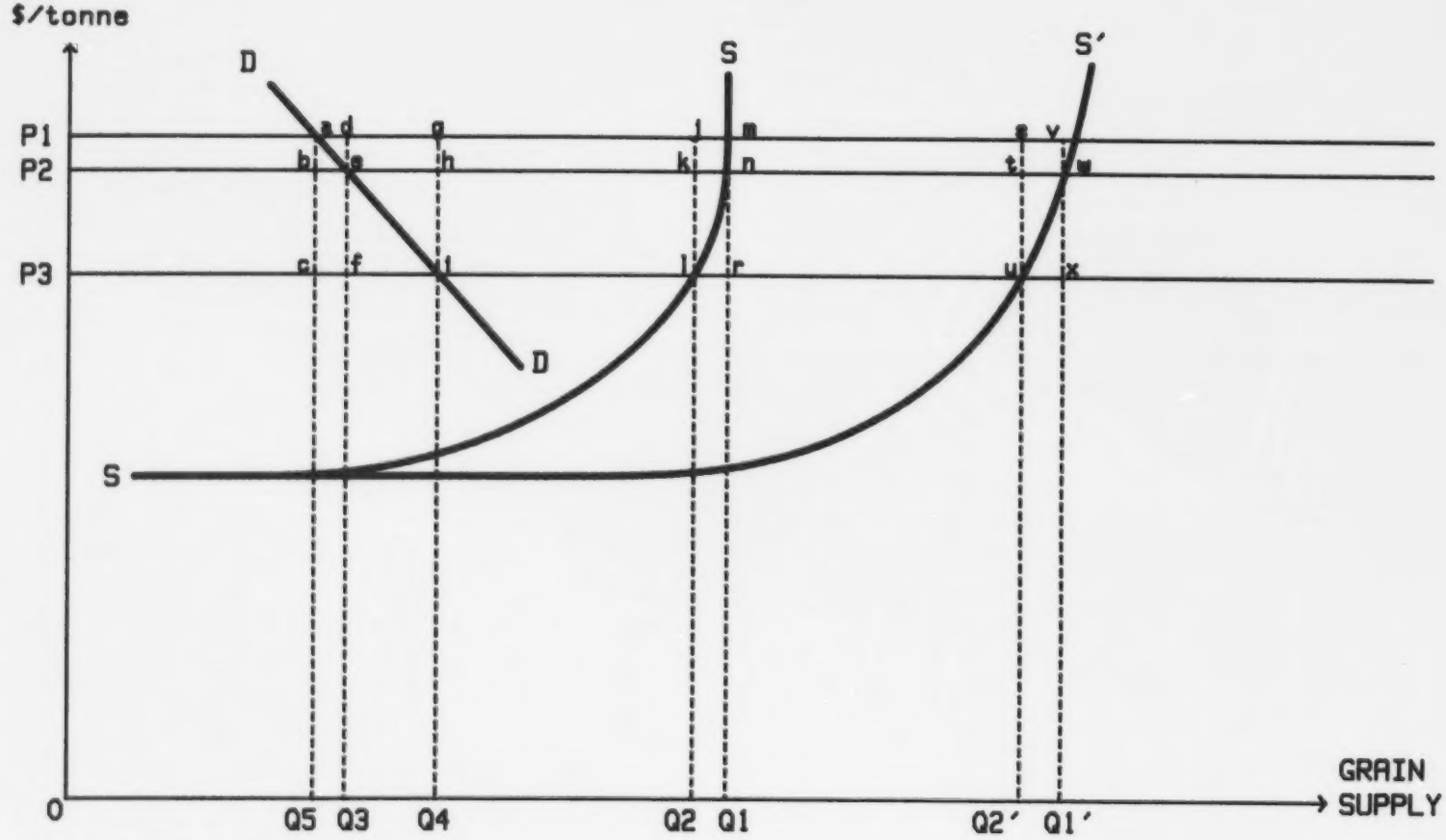
Diagram I-1 can be used to demonstrate the effects on western agriculture of the immediate introduction of compensatory freight rates, for example. The world price of Crow grain at the borders of the Prairie region is represented by the horizontal line P1, reflecting the fact that in the long run Canada is, for the most part, a price-taker in world grain markets. The horizontal line P2 gives the farmgate price of grain with the Crow intact while P3 shows the farmgate price that would occur if freight rates covered the full-costs of moving grain by rail. The vertical distance P1 P2 thus indicates grain handling and transportation system (GHTS) cost per tonne with the Crow and the distance P1 P3 shows the GHTS full cost per tonne with compensatory freight rates.

The local Prairie demand curve for Crow grain is given by DD while SS represents the existing long run supply curve of Prairie grain production. It is assumed to become completely inelastic at output OQ1 due to limited rail capacity, particularly through the western mountains. With fixed mainline capacity and given volumes of other railway traffic, producers are assumed to adjust their production to match available delivery opportunities in the long run. Introducing compensatory freight rates, and thereby eliminating the railways' losses from moving grain, will lead to a modernization and expansion of rail capacity in the west. Greater opportunities to deliver grain will induce farmers to expand production in the long run by leaving less acreage in summerfallow and by adopting more intensive cultivation and moisture conservation practices. The long run supply curve in grain production will shift to SS' as a result.

Under the current situation, grain production equals OQ1 with OQ3 retained on the Prairies for further processing by the livestock and agricultural processing industries. The rail movement of grain out of western Canada equals Q3-Q1. Total revenues accruing to the GHTS equal the area of the rectangle "denm" while the gross railway revenue shortfall equals the area of the rectangle "efrn".

By assuming a fixed amount of Crow grain per unit of processing output, including livestock, and by further assuming that the processing sectors adjust their output at the same rate[1], it is possible to interpret the curve DD as a Prairie demand curve for processed agricultural products measured in grain-equivalent terms. The line P1 can, therefore, be thought of as the average cost including transportation for Prairie processed output measured in grain-equivalent units at the borders of the western region with P2 representing average cost excluding transport charges. Hence, local consumption of processed grain output will equal P1a or OQ5 and exports of processed grain to eastern Canada and the rest of the world will equal "ad" or Q5-Q3.

DIAGRAM I-1
RFP AGRICULTURAL IMPACTS OF CROW CHANGE IN WESTERN CANADA



If the transportation constraint were to be removed without changing the Crow, then grain production in the long run would expand to OQ1'. Increasing the freight rates to compensatory levels would also expand the long run output of grain but only to OQ2', however, because farmgate prices of Crow grains would be lower than they would be in the former case. Grain moved out of western Canada would increase to Q4-Q2' while local grain use on the Prairies would increase to OQ4. Total revenues earned by the GHTS would increase to equal the area of the rectangle "dfus".

The RFP grain impact comprises three parts. Removal of the transport constraint, inducing production to expand, is taken to equal the area Q1mvQ1' minus the increased seed use (not shown). The acreage response, leading to a small reduction in output, equals Q2'svQ1' minus seed use saving, and the grain diversion from the export to the Prairie market equals Q3dgQ4. Overall, then, the net RFP grain estimate for the west, in terms of Diagram I-1, is measured by the area from removing the transport constraint minus the area from the acreage response, both net of seed use, minus the area from the grain diversion[2]. The net RFP grain impact includes the impact on the GHTS as well.

Reinterpreting the DD schedule as above to indicate local demand for grain processed products, including livestock and meat, production would increase by an amount Q3-Q4 measured in grain-equivalent terms as average cost falls by P2-P3 per unit of output. Exports of processed products off the Prairies would expand to Q5-Q4[3]. The RFP impact on the livestock, meat packing and grain-using industries in the west would equal the area Q3dgQ4 minus the increased statutory grain inputs which have been accounted for in the grain sector impacts[4]. Similar to the net RFP grain effect, the RFP processed product impact includes a transport component, at least in the case of livestock which was measured using index 100 Toronto hog prices and A1/A2 steer prices in the quantitative analysis. Assuming no change in real transport costs for processed products over the period to 1990-91, this component would be approximated by the area "abhg".

Finally, it can be noted that the long run grain supply curve might not shift as far as SS' due to a variety of non-transport considerations. The GI and CI RFP impacts were estimated assuming that grain production would not expand at all over the decade. In this case, the RFP grain impacts would be negative for the entire western region because there would be no grain expansion related to removing the transport constraint. The other RFP impacts would be unaffected. One empirical justification for going with SS' for the major policy options analysis is that the 1990-91 trend line projection for Crow grain production, incorporating 1982-83 production as a data point, works out very close to the FGPR 1990-91 estimate of 49.2 million tonnes.

APPENDIX II

GRAIN HANDLING AND TRANSPORTATION SYSTEM (GHTS)
COST AND RATE PROJECTIONS

To begin with, a low, high and medium set of annual crop year long run variable costs (LRVC) for moving Prairie grain by rail were estimated to 1990-91, based on different assumptions about volumes to be moved, inflation in rail costs and the 1981-82 cost base. These assumptions have been summarized in Table II of Chapter III, with the corresponding sets of LRVC labelled as I, II and III for the sake of convenience.

The low and medium LRVC estimates were based on Gilson's 1981-82 cost base[5]. A 1981-82 volume-related cost per tonne was calculated by dividing Gilson's total volume-related cost by his estimate of 30.4 million tonnes moved under Crow in that year. The annual crop year volume-related costs to 1990-91 were derived by applying the inflation rates and projected volumes - fixed at 31.0 million tonnes under the low cost scenario and increasing at 1.73% annually to 1985-86 and 3.48% annually to 1990-91 in both the medium and high cost scenarios[6] - to the 1981-82 volume-related cost per tonne. The line-related costs were taken directly from Gilson[7] and represent the estimates before adjustment for productivity due to hopper cars and branchline abandonments. The question of productivity has, for this study, been simplified by merely assuming that the three sets of inflation rates are net of productivity.

The high set of LRVC was based on increasing volumes, high inflation rates of 12%, 11%, 10%, 9% ... thereafter, and the railways' cost base for 1980[8]. The 1981-82 costs were derived as per Gilson[9] with the volume-related costs calculated in a similar manner as the low and medium volume-related costs. The line-related costs for years 1982-83 to 1990-91 were estimated by pro-rating the line-related costs in the low and medium cost estimates by the following proportion:

$$\frac{\text{Railways' 1981-82 line-related costs}}{\text{Gilson's 1981-82 line-related costs}}$$

The high LRVC estimates thus include both the Snavely[10] estimate of 25.4% cost of capital plus the return on the branchline rehabilitation assets. It is quite possible that the line-related costs have been underestimated in later years because no account has been taken of an increasing stock of rehabilitation assets earning a return for the railways. This is of no concern within the context of this study. The low and high sets of rail costs were estimated only to indicate the possible range of future rail costs and the resulting range within which the agricultural impacts both east and west might fall.

The estimated total railway revenue requirements were derived by assuming Gilson's[11] proposal on the contribution to constant or system costs. Gilson recommended that constant costs should amount to 20% of volume-related costs with the railways receiving zero contribution in 1982-83 but increasing up to the full contribution in 1985-86 and beyond.

Policy options corresponding to the Gilson proposals, the modified version of Gilson and the option favoured by the majority of agricultural organizations in eastern Canada were then applied to the railways' revenue requirements for the medium rail cost scenario to generate projected freight rates[12]. Only the Gilson option was applied to the low and high rail cost scenarios. Tables II-1 to II-5 contain the complete cost, revenue requirements and freight rate data for these options. In addition, the full-cost or compensatory freight rates corresponding to the three sets of rail costs have also been included in these tables.

The application of the Pools' proposal to the medium rail costs and revenue needs first required estimating the feed requirements per year in western Canada, as given in Table II-6. Dividing the total government cost share from Table II-3 by the volumes moved yielded a government cost share per tonne, as shown in Table II-7. The Crow distortion on feed prices was then taken to be 80% of the government's share per tonne, as per an early draft of the Pool proposal. Multiplying the annual cost share per tonne to be picked up by the government by the respective annual feed requirements gave the estimates of the total livestock payments. One-third of the livestock payments was then factored into the PIII freight rates, as indicated by Tables II-7.

It should be noted that the estimated government share of the gross railway revenue shortfall calculated in Tables II-1 to II-7 do not equal the projected total financial commitment of the government under these rail cost and policy option assumptions in that they exclude capital programs such as hopper car purchases, existing car leases and the branchline rehabilitation program. The government costs that have been included are those that would result from Gilson's cost base and would, therefore, affect the projected freight rates via the cost sharing and method of payment options.

Table II-8 contains projected elevator handling costs per tonne and projected GHTS rates. The elevator cost for 1981-82 was taken from Harvey and inflated by 10% per year to 1985-86 and 8.5% per year thereafter. These costs per tonne were then added to the nine series of projected freight rates from previous tables to derive the nine series of estimated GHTS rates.

TABLE II - 1

RAILWAY COSTS, COST SHARES AND FREIGHT RATES (GI, CI) UNDER THE
LOW RAIL COST SCENARIO WITH GILSON'S PAYMENT AND COST SHARING PROPOSALS

- CURRENT $ MILLION -

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Volumes	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
2. Volume-related cost/tonne [1]	19.48	20.84	22.30	23.86	25.53	26.81	28.15	29.56	31.04	32.59
3. Volume-related costs	604.0	646.0	691.3	739.7	791.4	831.1	872.7	916.4	962.2	1010.3
4. Line-related costs	108.8	114.2	120.3	123.7	123.7	117.2	124.2	131.7	139.6	148.0
5. Long run variable costs	712.8	760.2	811.6	863.4	915.1	948.3	996.9	1048.1	1101.8	1158.3
6. Constant costs	120.8	-	34.7	74.0	118.7	166.2	174.5	183.3	192.4	202.1
7. Total rail revenue needs	833.6	760.2	846.3	937.4	1033.8	1114.5	1171.4	1231.4	1294.2	1360.4
8. Crow revenues on 31.0 million tonnes	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6
9. Gross railway revenue shortfall	682.0	608.6	694.7	785.8	882.2	962.9	1019.8	1079.8	1142.6	1208.8
10. Shippers' share of inflation			22.8	48.2	76.3	117.7	162.3	209.2	258.5	310.3
11. Gov't share of revenue shortfall	682.0	608.6	671.9	737.6	805.9	845.2	857.5	870.6	884.1	898.5
12. Gov't payments to producers			220.4	300.2	390.9	476.7	550.5	627.7	715.2	726.9
13. Total shipper payments	151.6	151.6	394.8	500.0	618.8	746.0	864.4	988.5	1125.3	1188.8
14. Gilson freight rates (GI) [1]	4.89	4.89	12.74	16.13	19.96	24.06	27.88	31.89	36.30	38.35
15. Compensatory rates (CI) [1]	4.89	4.89	27.30	30.24	33.35	35.95	37.79	39.72	41.75	43.88

[1] $ per tonne

TABLE II - 2

RAILWAY COSTS, COST SHARES AND FREIGHT RATES (GII, CII) UNDER THE HIGH RAIL COST SCENARIO WITH GILSON'S PAYMENT AND COST SHARING PROPOSALS

- CURRENT $ MILLION -

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Volumes	31.0	31.5	32.1	32.6	33.2	34.4	35.6	36.8	38.1	39.4
2. Volume-related cost/tonne [1]	20.12	22.53	25.01	27.51	29.99	32.69	35.63	38.84	42.33	46.14
3. Volume-related costs	623.7	709.7	802.8	896.8	995.7	1124.5	1268.4	1429.3	1612.8	1817.9
4. Line-related costs	127.9	134.3	141.5	145.5	145.5	137.8	146.1	154.9	164.2	174.0
5. Long run variable costs	751.6	844.0	944.3	1042.3	1141.2	1262.3	1414.5	1584.2	1777.0	1991.9
6. Constant costs	124.7	—	40.1	89.7	149.4	224.9	253.7	285.9	322.6	363.6
7. Total rail revenue needs	876.3	844.0	984.4	1132.0	1290.6	1487.2	1668.2	1870.1	2099.6	2355.5
8. Crow revenues on 31.0 million tonnes	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6
9. Gross revenue shortfall	724.7	692.4	832.8	980.4	1139.0	1335.6	1516.6	1718.5	1948.0	2203.9
10. Revenue needs on 31.0 million tonnes	876.3	832.7	955.6	1083.6	1214.7	1353.9	1471.5	1599.7	1738.8	1890.4
11. Shippers' share of inflation			25.0	53.7	86.2	140.9	201.8	268.0	340.0	418.2
12. Shippers' share of volume			28.8	48.4	75.9	133.3	196.7	270.4	360.8	465.1
13. Shippers' payments sub-total			53.8	102.1	162.1	274.2	398.5	538.4	700.8	883.3
14. Gov't share of revenue shortfall	724.7	692.4	779.0	878.3	976.9	1061.4	1118.1	1180.1	1247.2	1320.6
15. Gov't payments to producers			255.5	357.5	473.8	598.6	717.8	850.9	1009.0	1068.4
16. Total shipper payments	151.6	151.6	460.9	611.2	787.5	1024.4	1267.9	1540.9	1861.4	2103.3
17. Gilson freight rates (GII) [1]	4.89	4.89	14.36	18.75	23.72	29.78	36.62	41.87	48.86	53.38
18. Compensatory rates (CII) [1]	4.89	4.89	30.67	34.73	38.87	43.23	46.86	50.82	55.11	59.78

[1] $ per tonne

TABLE II - 3

RAILWAY COSTS, COST SHARES AND FREIGHT RATES (GIII, CIII) UNDER THE MEDIUM RAIL COST SCENARIO WITH GILSON'S PAYMENT AND COST SHARING PROPOSALS

- CURRENT $ MILLION -

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Volumes	31.0	31.5	32.1	32.6	33.2	34.4	35.6	36.8	38.1	39.4
2. Volume-related cost/tonne[1]	19.48	21.23	23.14	25.23	27.50	29.97	32.67	35.61	38.82	42.31
3. Volume-related costs	604.0	668.7	754.4	822.5	913.0	1031.0	1163.1	1310.4	1479.0	1667.0
4. Line-related costs	108.8	114.2	120.3	123.7	123.7	117.2	124.2	131.7	139.6	148.0
5. Long run variable costs	712.8	782.9	874.7	946.2	1036.7	1148.2	1287.3	1442.1	1618.6	1815.0
6. Constant costs	120.8	-	37.7	82.3	137.0	206.2	232.6	262.1	295.8	333.4
7. Total rail revenue needs	833.6	782.9	912.4	1028.5	1173.7	1354.4	1519.9	1704.2	1914.4	2148.4
8. Crow revenues on 31.0 million tonnes	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6
9. Gross rail revenue shortfall	682.0	631.3	760.8	876.9	1022.1	1202.8	1368.3	1552.6	1762.8	1996.8
10. Revenue needs on 31.0 million tonnes	833.6	772.3	873.5	984.0	1104.1	1232.1	1339.6	1456.4	1583.7	1721.9
11. Shippers' share of inflation			23.2	49.4	78.9	128.6	184.0	244.3	309.8	381.1
12. Shippers'share of volume			38.9	44.5	69.6	122.3	180.3	247.8	330.7	426.5
13. Shippers'payments sub-total			62.1	93.9	148.5	250.9	364.3	492.1	640.5	807.6
14. Gov't share of revenue shortfall	682.0	631.3	698.7	783.0	873.6	951.9	1004.0	1060.5	1122.3	1189.2
15. Gov't payments to producers			229.2	318.7	423.7	536.9	644.6	764.6	907.9	962.1
16. Total shipper payments	151.6	151.6	442.9	564.2	723.8	939.4	1160.5	1408.3	1700.0	1921.3
17. Gilson freight rates (GIII)[1]	4.89	4.89	13.80	17.31	21.80	27.31	32.60	38.27	44.62	48.76
18. Compensatory rates (CIII)[1]	4.89	4.89	28.42	31.55	35.35	39.37	42.69	46.31	50.25	54.53

1 $ per tonne.

TABLE II - 4

RAILWAY COSTS, COST SHARES AND FREIGHT RATES (AIII) UNDER THE MEDIUM RAIL COST SCENARIO WITH A MODIFIED GILSON PAYMENT AND COST SHARING OPTION

- CURRENT $ MILLION -

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Volumes	31.0	31.5	32.1	32.6	33.2	34.4	35.6	36.8	38.1	39.4
2. Volume-related cost/tonne [1]	19.48	21.23	23.14	25.23	27.50	29.97	32.67	35.61	38.82	42.31
3. Volume-related costs	604.0	668.7	754.4	822.5	913.0	1031.0	1163.1	1310.4	1479.0	1667.0
4. Line-related costs	108.8	114.2	120.3	123.7	123.7	117.2	124.2	131.7	139.6	148.0
5. Long run variable costs	712.8	782.9	874.7	946.2	1036.7	1148.2	1287.3	1442.1	1618.6	1815.0
6. Constant costs	120.8	—	37.7	82.3	137.0	206.2	232.6	262.1	295.8	333.4
7. Total rail revenue needs	833.6	782.9	912.4	1028.5	1173.7	1354.4	1519.9	1704.2	1914.4	2148.4
8. Crow revenues on 31.0 million tonnes	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6
9. Gross rail revenue shortfall	682.0	631.3	760.8	876.9	1022.1	1202.8	1368.3	1552.6	1762.8	1996.8
10. Revenue needs on 31.0 million tonnes	833.6	772.3	873.5	984.0	1104.1	1232.1	1339.6	1456.4	1583.7	1721.9
11. Shippers' share of inflation			23.2	49.4	78.9	178.3	289.2	409.8	540.9	683.4
12. Shippers' share of volume			38.9	44.5	69.6	122.3	180.3	247.8	330.7	426.5
13. Shippers' payments sub-total			62.1	93.9	148.5	300.6	469.5	657.6	871.6	1109.9
14. Gov't share of revenue shortfall	682.0	631.3	698.7	783.0	873.6	902.2	898.8	895.0	891.2	886.9
15. Gov't payments to producers			229.2	318.7	423.7	508.8	577.0	645.3	721.0	717.5
16. Total shipper payments	151.6	151.6	442.9	564.2	723.8	958.0	1198.1	1454.5	1744.2	1979.0
17. Modified Gilson freight rates (AIII) [1]	4.89	4.89	13.80	17.31	21.80	27.85	33.65	39.52	45.78	50.23

[1] $ per tonne

TABLE II - 5

RAILWAY COSTS, COST SHARES AND FREIGHT RATES (EIII) UNDER THE MEDIUM RAIL COST SCENARIO WITH THE EASTERN PAYMENT AND COST SHARING PROPOSAL

- CURRENT $ MILLION -

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Volumes	31.0	31.5	32.1	32.6	33.2	34.4	35.6	36.8	38.1	39.4
2. Volume-related cost/tonne [1]	19.48	21.23	23.14	25.23	27.50	29.97	32.67	35.61	38.82	42.31
3. Volume-related costs	604.0	668.7	754.4	822.5	913.0	1031.0	1163.1	1310.4	1479.0	1667.0
4. Line-related costs	108.8	114.2	120.3	123.7	123.7	117.2	124.2	131.7	139.6	148.0
5. Long run variable costs	712.8	782.9	874.7	946.2	1036.7	1148.2	1287.3	1442.1	1618.6	1815.0
6. Constant costs	120.8	-	37.7	82.3	137.0	206.2	232.6	262.1	295.8	333.4
7. Total rail revenue needs	833.6	782.9	912.4	1028.5	1173.7	1354.4	1519.9	1704.2	1914.4	2148.4
8. Crow revenues on 31.0 million tonnes	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6
9. Gross rail revenue shortfall	682.0	631.3	760.8	876.9	1022.1	1202.8	1368.3	1552.6	1762.8	1996.8
10. Gov't share of shortfall	682.0	631.3	682.0	682.0	682.0	682.0	682.0	682.0	682.0	682.0
11. Total shipper payments	151.6	151.6	230.4	346.5	491.7	672.4	837.9	1022.2	1232.4	1466.4
12. "Eastern" freight rates (EIII) [1]	4.89	4.89	7.18	10.63	14.81	19.55	23.54	27.78	32.35	37.22

[1] $ per tonne

TABLE II - 6

ESTIMATED BASE FEED REQUIREMENTS PER YEAR
IN WESTERN CANADA TO 1990-91

- '000 tonnes -

YEAR	FGPR DATA	ANNUAL % INCREASE	ANNUAL FEED REQUIREMENTS
1981-82	4842		4842
1982-83	4856		4856
		0.41	
1983-84			4876
		0.41	
1984-85			4896
		0.41	
1985-86	4916		4916
		1.457	
1986-87			4988
		1.457	
1987-88			5060
		1.457	
1988-89			5134
		1.457	
1989-90			5209
		1.457	
1990-91	5285		5285

Source: These data were data from the Feed Grain Policy Review (FGPR) background data and are net of dairy feed requirements.

TABLE II - 7

RAILWAY COSTS, COST SHARES AND FREIGHT RATES (PIII) UNDER THE MEDIUM RAIL COST SCENARIO WITH THE POOL'S PAYMENT METHODS AND GILSON'S COST SHARING PROPOSALS

- CURRENT $ MILLION -

	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Volumes	31.0	31.5	32.1	32.6	33.2	34.4	35.6	36.8	38.1	39.4
2. Volume-related cost/tonne [1]	19.48	21.23	23.14	25.23	27.50	29.97	32.67	35.61	38.82	42.31
3. Volume-related costs	604.0	668.7	754.4	822.5	913.0	1031.0	1163.1	1310.4	1479.0	1667.0
4. Line-related costs	108.8	114.2	120.3	123.7	123.7	117.2	124.2	131.7	139.6	148.0
5. Long run variable costs	712.8	782.9	874.7	946.2	1036.7	1148.2	1287.3	1442.1	1618.6	1815.0
6. Constant costs	120.8	—	37.7	82.3	137.0	206.2	232.6	262.1	295.8	333.4
7. Total rail revenue needs	833.6	782.9	912.4	1028.5	1173.7	1354.4	1519.9	1704.2	1914.4	2148.4
8. Crow revenues on 31.0 million tonnes	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6
9. Gross rail revenue shortfall	682.0	631.3	760.8	876.9	1022.1	1202.8	1368.3	1552.6	1762.8	1996.8
10. Gov't share of shortfall	682.0	631.3	698.7	783.0	873.6	951.9	1004.0	1060.5	1122.3	1189.2
11. Shipper payments sub-total	151.6	151.6	213.7	245.5	300.1	402.5	515.9	643.7	792.1	959.2
12. Gov't share per tonne [1]			21.77	24.02	26.31	27.67	28.20	28.82	29.46	30.18
13. Total livestock payment			85.0	94.1	103.4	110.4	114.2	118.4	122.8	127.6
14. Producer share of livestock payment			28.3	31.4	34.5	36.8	38.1	39.5	40.9	42.5
15. Total shipper payments	151.6	151.6	242.0	276.9	334.6	439.3	554.0	683.2	833.0	1001.7
16. Pools freight rates (PIII) [1]	4.89	4.89	7.54	8.49	10.08	12.77	15.56	18.56	21.86	25.42

[1] $ per tonne

TABLE II - 8

GRAIN HANDLING AND TRANSPORTATION SYSTEM (GHTS) RATES BY POLICY OPTION TO 1990-91

- $ PER TONNE -

		1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91
1. Handling costs		15.70	17.27	19.00	20.90	22.99	24.94	27.06	29.36	31.86	34.57
2. GHTS rates - Gilson I	(GI)	20.59	22.16	31.74	47.03	42.95	49.00	54.94	61.25	68.16	72.92
2. - Compensatory I	(CI)	20.59	22.16	46.30	51.14	56.34	70.89	64.85	69.08	73.61	78.45
4. - Gilson II	(GII)	20.59	22.16	33.36	39.65	46.71	54.72	63.68	71.23	80.72	87.95
5. - Compensatory II	(CII)	20.59	22.16	49.67	35.63	61.86	67.17	73.92	80.18	86.97	94.35
6. - Gilson III	(GIII)	20.59	22.16	32.80	38.21	44.79	52.25	59.66	67.63	76.48	83.33
7. - Compensatory III	(CIII)	20.59	22.16	47.42	52.45	58.54	64.31	69.75	75.67	82.11	89.10
8. - Modified Gilson III	(AIII)	20.59	22.16	32.80	38.21	44.79	52.79	60.71	68.88	77.64	84.80
9. - Eastern III	(EIII)	20.59	22.16	26.18	31.53	37.80	44.49	50.60	57.14	64.21	71.79
10 - Pools III	(PIII)	20.59	22.16	26.54	29.39	23.07	37.71	42.62	47.92	53.72	59.99

APPENDIX III
GRAIN AND LIVESTOCK PRICE FORECASTS

1. Grain Price Forecasts

Table III-1 contains annual crop year forecasts of the port prices of the six Crow grains. Wheat prices were projected to 1990-91 by using the annual percentage changes in wheat prices contained in Harvey[13] and applied to the 1981-82 actual wheat price[14]. Rapeseed, flax, oats and rye prices were estimated on the basis of simple regression equations, with the wheat price as the independent variable in the rapeseed equation, using historical prices from 1971-72 to 1981-82[15]. Flax prices were estimated from rapeseed prices and both oats and rye prices were estimated from barley prices.

Projected barley prices reflect a composite based on Harvey's[16] barley/wheat relative price and the trend line projection of the 1990-91 barley price. The relative price of barley to wheat has fallen significantly in the last few years compared with the situation over the 1970's. Using historical prices up to 1982, the trend line barley price projection in 1990-91 was $341 per tonne, thus reflecting the lower relative price of barley in the recent past. On the other hand, applying Harvey's 1990 barley/wheat proportion to the projected wheat price of $465 yielded a 1990 barley price of $394 per tonne. Averaging these two estimates gave a 1990-91 barley price of $367. Using this figure in the barley - wheat regression equation permitted barley prices to be estimated for years leading up to 1990-91. It should be noted that $367 is almost the exact 1990-91 barley price that one would derive if Harvey's 1981 barley/wheat proportion were applied to the projected 1990-91 wheat price of $465 per tonne[17]. Harvey's 1981 barley and wheat prices were estimated from trend line analysis that reflects in a more significant manner the historical price relatives of the 1970's.

Table III-2 gives the 1990-91 farmgate grain prices for the base case of no-Crow change as well as for the policy options under the medium rail cost scenario. They were calculated by subtracting the estimated 1990-91 GHTS rates in Table II-9 from the 1990-91 projected port grain prices in Table III-1.

2. Livestock Price Forecasts

Index 100 Toronto hog prices and A1 A2 Toronto steer prices were forecast to 1990-91 based on the percentage price changes calculated from Harvey[18]. These percentage changes were then applied to the 1981 and 1982 prices taken or derived from the June 1982 edition of Agriculture Canada's Market Commentary. 1982 prices were calculated as the sum of the first five months prices plus seven times the mid-point forecast for the remainder of 1982, all divided by 12. These projections are contained in Table III-3.

TABLE III - 1

GRAIN PRICE FORECASTS TO 1990-91

- $ per tonne -

Year	Wheat	Barley	Rapeseed	Oats	Flax	Rye
1982-83	231	186	327	143	372	169
84	251	201	345	153	395	184
85	276	219	367	166	424	201
86	302	239	391	180	454	220
87	329	259	415	194	485	239
88	357	280	440	209	517	259
89	386	301	466	223	551	280
90	428	333	503	246	598	310
91	465	367	540	269	650	343

TABLE III - 2

PROJECTED FARMGATE GRAIN PRICES IN 1990-91

Policy Option	Wheat	Barley	Rapeseed	Oats	Flax	Rye
Base	426	328	501	230	611	304
GIII	382	284	457	186	567	260
CIII	376	278	451	180	561	254
AIII	380	282	455	185	565	259
EIII	393	295	468	197	578	271
PIII	405	307	480	209	590	283

Source: Tables II - 9 and III - 1.

TABLE III - 3

LIVESTOCK PRICE FORECASTS TO 1990

Year	Hogs - $ per lb -	Beef $ per cwt
1981	0.70	80
1982	0.84	84
1983	0.80	91
1984	0.95	100
1985	1.15	105
1986	1.25	113
1987	1.35	123
1988	1.47	133
1989	1.59	144
1990	1.73	156

APPENDIX IV

METHODOLOGY AND ESTIMATES OF THE REAL FINAL PRODUCT (RFP) IMPACTS IN 1990-91

1. Grain Production Responses

Two separate grain production responses were estimated for this study. The first response centered around the transportation constraint possibility and the impact that this could have on Prairie grain production while the second response involved estimating the change in statutory grain acreage and, hence, production as a result of higher freight rates.

a) Transport Constraint Effect

In estimating 1990-91 production levels for statutory grain, it was assumed that seeded acreage of these crops would reflect constraints in the grain transportation system if the Crow rates were left unchanged and the railways continued to incur losses in moving grain. Greater delivery opportunities to move Prairie grain will depend directly on Crow change. It was assumed that rail capacity in the west would expand to accommodate greater exports of grain only if the railways' losses from moving grain were eliminated, given that the governemnt has directly linked Crow change with compensating the railways in its February 8th, 1982, Policy Statement on the Western Transportation Initiative. It was felt, therefore, that Prairie farmers would increase their acreage and production of statutory grain by taking land out of summerfallow only if the Crow rates were changed. In the absence of Crow reform, it was assumed that seeded acreage of these crops would not change from what occurred in 1981-82. It was further assumed that if any of the policy options to changing Crow were implemented, the grain transportation and handling system would impose no constraint on deliveries so that seeded acreage would expand to a level consistent with exports of about 36 million tonnes in 1990-91.

Two projections of statutory grain acreage and production in 1990-91 were estimated using Feed Grain Policy Review (FGPR) data. The first estimate was based on the assumption of a constrained transport and delivery system with acreage and production based closely on actual 1981-82 data. To avoid the situation that occurred in 1981-82 whereby the actual volumes of rapeseed moved by rail and the volumes crushed in the west were greater than production, implying a decline in stocks, rapeseed acreage and production in 1990-91 were assumed to increase to equal the 1981-82 western crush plus rail exports from the Prairies. Wheat acreage and production were decreased

accordingly. The second estimate involving the assumption of an unconstrained transport and delivery system was taken directly from the FGPR projection of statutory grain acreage and production for 1990-91. Both the constrained and unconstrained estimates are given in Table IV-1.

It should be noted that the constrained case of statutory grain production is the base case from which the grain impacts of Crow change have been measured. This case does imply a maximum rail movement of Crow grain equal to the 1981-82 estimate of 31.0 million tonnes. This does not imply that the low rail cost scenario involving a constant rail movement of 31.0 million tonnes involves a constrained transport and delivery system; rather, the low rail cost scenario was calculated only to derive the minimum bounds of the range of possible Crow reform impacts on agriculture.

The transport constraint-related RFP grain impacts were calculated by multiplying the differences between the constrained and unconstrained production estimates by the respective port grain prices. The estimated impacts, which are contained in Tables IV-3 to IV-11, are constant across all policy options with the exception of GI and CI.

b) Grain Acreage Effect

As freight rates increase, farmgate prices of statutory grain will fall. Because Crow grains are not all equally priced, however, this will result in different percentage price declines which will bring about changes in the acreage seeded to these crops. In particular, it can be expected that while total acreage seeded to Crow grains will decrease, the acreage seeded to higher-valued crops like wheat and rapeseed will increase.

The estimation of the RFP grain production impacts from the acreage response follows Harvey's procedure[19]. The same elasticities were used to estimate these impacts for the GI and CI options as well as the remaining seven options, even though the grain production forecasts were different. The first two options were based on the low rail cost scenario assuming constant volumes over the decade. These volumes would be consistent with the constrained production case even though an unconstrained delivery system is assumed. In terms of Diagram I-1, these two options would occur if there was no shift of the long run grain supply curve. While using the same elasticities with different supply curves could introduce some errors into the RFP estimates one way or the other, it is doubtful if these errors would be serious. Table IV-3 contains the grain production changes by policy

option from the acreage response effect. The RFP grain acreage impacts are given in Tables IV-3 to IV-11.

2. Livestock Effects

The RFP livestock impacts were calculated using Harvey's implicit dynamic multipliers with respect to changes in western grain prices[20]. It was not necessary to estimate base livestock production levels in 1990-91 or preceding years to calculate the RFP impacts of Crow change. These impacts are best interpreted as the changes that would occur from 1990-91 levels given whatever point in the beef and hog cycles that would have obtained in that year. That is, the various options for Crow change would imply greater western livestock output by 1990-91 regardless of whether this output was increasing or decreasing according to the hog and beef cycles.

3. Agriculture Processing Responses

The RFP agriculture processing impacts, covering meat packing, rapeseed crushing and feed milling, were based on Harvey's value-added per tonne estimates for 1981. They were projected to 1990 by increasing them at 10% per year to 1985 and 8.5% per year thereafter. The impacts were then calculated for each policy option as per Harvey[21].

TABLE IV-1

PRAIRIE GRAIN ACREAGE AND PRODUCTION
ESTIMATES IN 1990-91

- '000 hectares and tonnes -

Statutory Grain	Constrained Case		Unconstrained Case	
	Acreage	Production	Acreage	Production
Wheat	11,779	23,335	13,740	29,386
Barley	5,066	12,459	5,108	13,356
Rapeseed	1,792	2,190	2,046	2,633
Oats	1,340	2,771	1,155	2,550
Rye	425	903	337	650
Flax	466	477	580	635
Total	20,868	42,135	22,966	49,210

Source: Feed Grain Policy Review background data.

TABLE IV - 2

PRAIRIE GRAIN PRODUCTION CHANGES IN 1990-91 FROM THE ACREAGE RESPONSE TO CROW CHANGE

- '000 tonnes -

Policy Option	Wheat	Barley	Rapeseed
GI	456	- 880	47
CI	522	-1,013	55
GII	640	-1,279	68
CII	747	-1,480	79
GIII	612	-1,201	66
CIII	653	-1,308	70
AIII	618	-1,227	66
EIII	417	- 840	44
PIII	285	- 561	31

TABLE IV - 3

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH FIXED VOLUME, LOW INFLATION AND GILSON'S PAYMENT METHOD AND COST SHARING PROPOSALS - 1990 $ MILLION (GI)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport									
- Production response from acreage change				- 32.3	56.0	- 115.2		- 91.5	- 91.5
- Change in feed use	0.5	3.6	6.5	- 84.2	- 54.5	- 333.3	10.6	- 472.0	- 461.4
- Total	0.5	3.6	6.5	- 116.5	1.5	- 448.5	10.6	- 563.5	- 552.9
Livestock:									
- Hogs	- 0.6	- 5.1	- 5.0	92.9	40.3	176.5	- 10.7	309.7	299.0
- Beef	- 0.9	- 3.7	- 11.7	71.7	60.2	416.0	- 16.3	547.3	531.0
- Total	- 1.5	- 8.8	- 16.7	164.6	100.5	592.5	- 27.0	857.0	830.0
Total Agriculture	- 1.0	- 5.2	- 9.8	48.1	102.0	144.0	- 16.4	293.5	277.1
Agricultural Processing:									
- Rapeseed crushing							- 23.9	29.1	5.2
- Meat packing								227.8	227.8
- Feed milling								16.4	16.4
- Total							- 23.9	273.3	249.4
GRAND TOTAL	- 1.0	- 5.2	- 9.8	48.1	102.0	144.0	- 40.3	566.8	526.5

TABLE IV - 4

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH FIXED VOLUMES, LOW INFLATION AND ASSUMING FULL COMPENSATORY RATES IN 1983-84 AND BEYOND - 1990 $ MILLION (CI)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport									
- Production response from acreage change				- 37.2	74.5	- 133.9		- 96.6	- 96.6
- Change in feed use	0.8	5.7	10.0	- 118.3	- 78.1	- 481.7	16.5	- 678.1	- 661.6
- Total	0.8	5.7	10.0	- 155.5	- 3.6	- 615.6	16.5	- 774.7	- 758.1
Livestock:									
- Hogs	- 0.8	- 8.4	- 8.2	121.8	52.8	231.4	- 17.4	406.0	388.6
- Beef	- 1.2	- 5.5	- 17.3	112.3	95.0	656.7	- 24.0	864.0	840.0
- Total	- 2.0	- 13.9	- 25.5	234.1	147.8	888.1	- 41.4	1270.0	1228.6
Total Agriculture	- 1.2	- 8.2	- 15.5	78.6	144.2	272.5	- 24.9	495.3	470.4
Agriculture Processing:									
- Rapeseed crushing							- 23.9	30.0	6.1
- Meat packing								334.2	334.2
- Feed milling								24.3	24.3
- Total							- 23.9	388.5	364.6
GRAND TOTAL	- 1.2	- 8.2	- 15.5	78.6	144.2	272.5	- 48.8	883.8	835.0

TABLE IV - 5

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, HIGH INFLATION AND GILSON'S PAYMENT METHOD AND COST SHARING PROPOSALS - 1990 $ MILLION (GII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production response from acreage change				- 48.9	87.5	- 129.6		- 91.0	- 91.0
- Change in feed use	0.8	5.3	9.0	- 114.8	- 74.3	- 453.0	15.1	- 642.1	- 627.0
- Total	0.8	5.3	9.0	337.8	1917.1	224.6	15.1	2479.5	2494.6
Livestock:									
- Hogs	- 0.7	- 6.9	- 6.7	127.0	55.0	241.3	- 14.3	423.3	409.0
- Beef	- 1.0	- 4.9	- 15.3	95.5	80.8	558.3	- 21.2	734.6	713.4
- Total	- 1.7	- 11.8	- 22.0	222.5	135.8	799.6	- 35.5	1157.9	1122.4
Total Agriculture	- 0.9	- 6.5	- 13.0	560.3	2052.9	1024.2	- 20.4	3637.4	3617.0
Agriculture Processing:									
- Rapeseed crushing							- 23.9	80.3	56.4
- Meat packing								309.2	309.2
- Feed milling								22.2	22.2
- Total							- 23.9	411.7	387.8
GRAND TOTAL	- 0.9	- 6.5	- 13.0	560.3	2052.9	1024.2	- 44.3	4049.1	4004.8

TABLE IV - 6

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, HIGH INFLATION AND ASSUMING FULL COMPENSATORY FREIGHT RATES IN 1983/84 AND BEYOND - 1990 $MILLION (CII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production from acreage change				- 55.1	103.0	- 196.5		- 148.6	- 148.6
- Change in feed use	1.0	7.2	12.4	- 152.5	- 100.3	- 617.3	20.6	- 870.1	- 849.5
- Total	1.0	7.2	12.4	293.9	1906.6	- 6.6	20.6	2193.9	2214.5
Livestock:									
- Hogs	- 1.1	- 10.5	- 10.3	158.9	68.8	301.9	- 21.9	529.6	507.7
- Beef	- 1.5	- 6.7	- 21.0	140.5	118.9	821.4	- 29.2	1080.8	1051.6
- Total	- 2.6	- 17.2	- 31.3	299.4	187.7	1123.3	- 51.1	1610.4	1559.3
Total Agriculture	- 1.6	- 10.0	- 18.9	593.3	2094.3	1116.7	- 30.5	3804.3	3773.8
Agriculture Processing:									
- Rapeseed crushing							- 23.9	81.5	57.6
- Meat packing								426.9	426.9
- Feed milling								30.9	30.9
- Total							- 23.9	539.3	515.4
GRAND TOTAL	- 1.6	- 10.0	- 18.9	593.3	2094.3	1116.7	- 54.4	4343.6	4289.2

TABLE IV - 7

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, MEDIUM INFLATION AND GILSON'S PAYMENT METHOD AND COST SHARING PROPOSALS - 1990 $ MILLION (GIII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production from acreage change				- 44.5	86.1	- 158.6		- 117.0	- 117.0
- Change in feed use	0.5	4.4	7.8	- 103.2	- 66.8	- 407.6	12.7	- 577.6	- 564.9
- Total	0.5	4.4	7.8	353.8	1923.2	241.0	12.7	2518.0	2530.7
Livestock:									
- Hogs	- 0.6	- 6.2	- 6.1	114.3	49.5	217.2	- 12.9	381.0	368.1
- Beef	- 1.0	- 4.4	- 13.9	86.1	72.8	503.1	- 19.3	662.0	642.7
- Total	- 1.6	- 10.6	- 20.0	200.4	122.3	720.3	- 32.2	1043.0	1010.8
Total Agriculture	- 1.1	- 6.2	- 12.2	554.2	2045.5	961.3	- 19.5	3561.0	3541.5
Agriculture Processing:									
- Rapeseed crushing							- 23.9	80.1	56.2
- Meat packing								278.1	278.1
- Feed milling								20.0	20.0
- Total							- 23.9	378.2	354.3
GRAND TOTAL	- 1.1	- 6.2	- 12.2	554.2	2045.5	961.3	- 43.4	3939.2	3895.8

TABLE IV - 8

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, MEDIUM INFLATION AND ASSUMING FULL COMPENSATORY FREIGHT RATES IN 1983-84 AND BEYOND - 1990 $ MILLION (CIII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production from acreage change				- 49.6	89.6	- 174.3		- 134.3	- 134.3
- Change in feed use	0.9	6.5	11.3	-1380.0	- 90.7	- 558.3	18.7	- 787.0	- 768.3
- Total	0.9	6.5	11.3	313.9	1902.8	. 74.6	18.7	2291.3	2310.0
Livestock:									
- Hogs	- 0.9	- 9.5	- 9.3	143.6	62.2	273.0	- 19.7	478.8	459.1
- Beef	- 1.4	- 6.2	- 19.5	127.6	108.0	746.2	- 27.1	918.8	954.7
- Total	2.3	- 15.7	- 28.8	271.2	170.2	1019.2	- 46.8	1460.6	1413.8
Total Agriculture	- 1.4	- 9.2	- 17.5	585.1	2073.0	1093.8	- 28.1	3751.9	3723.8
Agriculture Processing:									
- Rapeseed crushing							- 23.9	80.1	56.2
- Meat packing								386.4	386.4
- Feed milling								28.0	28.0
- Total							- 23.9	494.5	470.6
Grand Total	- 1.4	- 9.2	- 17.5	585.1	2073.0	1093.8	- 52.0	4246.4	4194.4

TABLE IV-9

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, MEDIUM INFLATION AND AN ALTERNATIVE TO GILSON'S PAYMENT METHOD AND COST SHARING PROPOSALS - 1990 $ MILLION (AIII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production from acreage change				- 45.9	85.4	- 163.1		- 123.6	- 123.6
- Change in feed use	0.7	4.4	7.9	- 106.5	- 68.8	- 419.3	13.0	- 594.6	- 581.6
- Total	0.7	4.4	7.9	349.1	1920.5	224.8	13.0	2494.4	2507.4
Livestock:									
- Hogs	- 0.6	- 6.4	- 6.3	118.1	51.2	224.2	- 13.3	393.5	380.2
- Beef	- 1.0	- 4.5	- 14.2	88.2	74.6	515.5	- 19.7	678.3	658.6
- Total	- 1.6	- 11.1	- 20.5	206.3	125.8	739.7	- 33.0	1071.8	1038.8
Total Agriculture	- 0.9	- 6.7	- 12.6	555.4	2046.3	964.5	- 20.0	3566.2	3546.2
Agriculture Processing:									
- Rapeseed crushing							- 23.9	80.1	56.2
- Meat packing								286.1	286.1
- Feed milling								20.5	20.5
- Total							- 23.9	386.7	362.8
GRAND TOTAL	- 0.9	- 6.7	- 12.6	555.4	2046.3	964.5	- 43.9	3952.9	3909.0

TABLE IV-10

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, MEDIUM INFLATION, PAYMENT OF THE 1981-82 CROW GAP TO THE RAILWAYS AND PRODUCERS PAYING FOR ALL OF FUTURE VOLUME AND INFLATION - 1990 $ million (EIII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production from acreage change				- 32.3	37.5	- 93.5		- 88.3	- 88.3
- Change in feed use	0.3	2.7	5.1	- 66.5	- 42.9	- 262.5	8.1	- 371.9	- 363.8
- Total	0.3	2.7	5.1	402.7	1898.5	451.2	8.1	2752.4	2760.5
Livestock:									
- Hogs	- 0.4	- 3.6	- 3.5	78.1	33.8	148.4	- 7.5	260.3	252.8
- Beef	- 0.7	- 3.1	- 9.6	55.7	47.2	325.9	- 13.4	428.8	415.4
- Total	- 1.1	- 6.7	- 13.1	133.8	81.0	474.3	- 20.9	689.1	668.2
Total Agriculture	- 0.8	- 4.0	- 8.0	536.5	1979.5	925.5	- 12.8	3441.5	3428.7
Agriculture Processing:									
- Rapeseed crushing							- 23.9	73.3	49.4
- Meat packing								183.9	183.9
- Feed milling								12.9	12.9
- Total							- 23.9	270.1	246.2
GRAND TOTAL	- 0.8	- 4.0	- 8.0	536.5	1979.5	925.5	- 36.7	3711.6	3674.9

TABLE IV - 11

REAL FINAL PRODUCT IMPACTS BY SECTOR AND PROVINCE/REGION WITH INCREASING VOLUMES, MEDIUM INFLATION AND CORRESPONDING TO THE POOLS' PROPOSAL - 1990 $ million (PIII)

	ATLANTIC PROVINCES	QUEBEC	ONTARIO	MANITOBA	SASKATCHEWAN	ALBERTA/ B. C.	EASTERN CANADA	WESTERN CANADA	TOTAL CANADA
Grain Exports:									
- Production from increased transport				501.5	1903.9	807.2		3212.6	3212.6
- Production from acreage change				- 20.4	40.0	- 74.7		- 55.1	- 55.1
- Change in feed use	0.8	5.5	9.6	- 118.6	- 78.0	- 478.7	15.9	- 675.3	- 659.4
- Total	0.8	5.5	9.6	362.5	1865.9	253.8	15.9	2482.2	2498.1
Livestock:									
- Hogs	- 0.9	- 8.1	- 7.9	124.4	53.9	236.4	- 16.9	414.7	397.8
- Beef	- 1.1	- 5.3	- 16.5	109.0	92.2	636.9	- 22.9	838.1	815.2
- Total	- 2.0	-13.4	- 24.4	233.4	146.1	873.3	- 39.8	1252.8	1213.0
Total Agriculture	- 1.2	- 7.9	- 14.8	595.9	2012.0	1127.1	- 23.9	3735.0	3711.1
Agriculture Processing:									
- Rapeseed crushing							- 23.9	73.1	49.2
- Meat packing								329.6	329.6
- Feed milling									
- Total							- 23.9	402.7	378.8
GRAND TOTAL	- 1.2	- 7.9	- 14.8	595.9	2012.0	1127.1	- 47.8	4137.7	4089.9

APPENDIX V

METHODOLOGY AND ESTIMATES OF NET FARM INCOME IMPACTS

Agriculture Canada maintains a set of budgets for 13 farm types in each province which provide an aggregate income and expense statement for each type of farm. Information on the number of farms of each type is also available so that it is possible to derive an income and expense statement for the average farm of each type. These budgets were used to obtain estimates of the longer-run effects of the proposed alternative Crow change options on different regions and different types of farms.

In determining the impact of a change in the Crow rate on income in 1990, it was necessary to obtain estimates of cash receipts from all commodities produced, and operating expenses under the status quo or base case of no-Crow change as well as the alternative options for Crow reform in each province/region.

Cash receipts were estimated in terms of changes in production and prices. Price and production information for those commodities which would not be affected by changes in the Crow rates were estimated by using the farm budget model. Farmgate prices of the six Crow grains plus hog and beef prices used to estimate the income effects of Crow change plus the base case are given in Appendix III, as are the base grain production levels. Changes in livestock and grain production were taken from the real final product estimates.

To estimate 1990 farm receipts for each of the five major commodities (wheat, coarse grains, oilseeds, hogs and cattle) in the base case and in the alternative approaches to changing the Crow rate, the receipts in 1982 were multiplied by (a) the percentage change in production level and (b) the percentage change in price. Other cash receipts (such as those from marketings of potatoes, corn, other crops, dairy, other livestock; all government deficiency and supplementary payments; and income-in-kind) were estimated using the Farm Income Forecasting model developed by Agriculture Canada. Production levels of commodities other than the five major commodities listed above were assumed to be independent of changes in freight rates.

Production levels and feed costs together with other general economic variables such as interest rates, wage rates, fertilizer prices, etc. were used in the Farm Income Component of the FARM Model developed by Agriculture Canada to estimate total operating expenses and depreciation charges.

The realized net farm income before Crow payment is then equal to the difference between the estimated total cash receipts and total operating expenses and depreciation charges plus the estimated income-in-kind.

In determining the impact of alternative approaches to changing the Crow rate on different types of farm in the western region, the Farm Budgets developed from the Farm Enumerative Survey (FES) were used.

Farm receipts in the FES survey are not estimated directly by the farmer, but are obtained by imputation. That is, estimates are made of the average sales per acre of crops and per head of livestock at the provincial level and then applied to the acreages under various crops, and to the numbers of livestock on farms to estimate commodity sales. Estimates of various operating expense items and depreciation charges are obtained directly from the farmer.

Farms are classified by type on the basis of sales of a given commodity being 51 percent or more of total sales. This procedure also allows individual receipts and expenses to be classified by farm type, providing fairly detailed farm budgets. The types listed below were used in the western impact analyses. In the case of eastern Canada, impacts were estimatmed on "all farms" only.

1. Grains and Oilseeds
   (a) wheat
   (b) coarse grains
   (c) oilseeds (flax and rapeseed)
   (d) mixed grains

2. Livestock
   (a) dairy
   (b) cattle and calves
   (c) hogs
   (d) poultry
   (e) mixed livestock

3. All types (includes those above and also other crop farms, other livestock farms, and miscellaneous mixed farms).

These budget data were used to allocate the estimated cash receipts and expenses by farm type under each policy option in order to generate realized net farm income for each province/region. It was assumed in making these projections that the proportion of different commodities produced by farm type would remain unchanged in 1990.

The FES survey also generates estimates of numbers of farms and land utilization by type of farm. The estimated numbers of farms by type of farm were divided into corresponding aggregate values to obtain estimates of income changes on a per farm basis.

Two different methods were used to allocate the estimated federal compensation to producers under the various policy options. Estimates of total cropland (acreage in crops and summerfallow)

for each farm type were used to allocate the estimated amount of federal compensations of G III, C III and A III by farm type. For the Pool proposal (P III) the estimated total livestock receipts by type of farm were used.

Due to an inadequate allowance for feed consumed on farms, the FES type of farm classification tends to overestimate the number of grain farms and to underestimate the number of livestock farms. Hence, a similar bias is transmitted to the distribution of the federal payment among farm types.

The per farm income figures are generally less reliable than the aggregate figures. Estimates of farm numbers are subject to errors the magnitude of which have not yet been fully assessed. This may compound the errors present in the aggregate series, especially in regard to the absolute levels of income per farm.

It would be desirable to use what is considered a normal year for the base case. Because farm income fell in 1982 over 1981, and as the methodology relies on percentage changes, the magnitude of the impacts and adjustments, especially those based on cash receipts, may be biased downwards.

The implicit assumption that a constant proportion of total grain production will be fed on farms or held as stocks results in an overestimate of grain receipts when livestock production increases. This limitation will have its greatest impact on the estimate of grain receipts of livestock farms under the P III option.

Farm operating expenses were estimated using historical input-output relationships which may change. For example, production costs may increase as grain producers with little experience in livestock production start up livestock enterprises.

TABLE V - 1

IMPACT ON THE NET INCOME OF FARMERS IN AGGREGATE AND ON A PER FARM BASIS, OF ALTERNATIVE CROW RATE PROGRAMS, MANITOBA, 1990

Items	Aggregate - Million Dollars (1990 Dollars) - Grains & Oilseeds	Aggregate - Million Dollars (1990 Dollars) - Livestock	Aggregate - Million Dollars (1990 Dollars) - All Farms[b]	per Farm[c] - 1990 Dollars - Grains & Oilseeds	per Farm[c] - 1990 Dollars - Livestock	per Farm[c] - 1990 Dollars - All Farms[b]
I. Base Case Budget						
A. Receipts						
1. Grains & Oilseeds	1476	224	1854	100027	21729	63801
2. Livestock	124	997	1210	8403	96712	41639
3. Other Receipts	88	37	214	5964	3589	7364
4. Total Receipts (SUM 1-4)	1688	1258	3278	114394	122029	112805
B. Expenses						
1. Total Operating & Depreciation	1546	1033	2944	104771	100204	101311
C. Realized Net Income[a]	154	235	360	10436	22796	12389
II. Impact Analysis						
A. Gilson (GIII)						
1. Change in Grain Receipts	+92	+9	+108	+6235	+873	+3717
2. Change in Livestock Receipts	+23	+174	+217	+1559	+16879	+7468
3. Change in Operating & Depreciation	+120	+97	+246	+8132	+9409	+8466
4. Change in Realized Net Income (1+2-3)	-5	+86	+79	-339	+8342	+2719
5. Change in Realized Net Income Including Crow Payments	+89	+120	+225	+6031	+11640	+7743
B. Compensatory Rate (CIII)						
1. Change in Grain Receipts	+68	+5	+76	+4608	+485	+2615
2. Change in Livestock Receipts	+33	+235	+295	+2236	+22796	+10152
3. Change in Operating & Depreciation	+133	+116	+281	+9013	+11252	+9670
4. Change in Realized Net Income (1+2-3)	-32	+124	+90	-2169	+12028	+3097
5. Change in Realized Net Income Including Crow Payments	+64	+158	+236	+4337	+15326	+8121
C. Alternative to Gilson (AIII)						
1. Change in Grain Receipts	+84	+8	+98	+5693	+776	+3372
2. Change in Livestock Receipts	+24	+179	+224	+1626	+17363	+7708
3. Change in Operating & Depreciation	+119	+97	+244	+8065	+9409	+8397
4. Change in Realized Net Income (1+2-3)	-11	+90	+78	-745	+8730	+2684
5. Change in Realized Net Income Including Crow Payments	+59	+115	+187	+3999	+11156	+6435
D. Payments to Railways (EIII)						
1. Change in Grain Receipts	+138	+16	+165	+9352	+1552	+5679
2. Change in Livestock Receipts	+15	+117	+145	+1017	+11349	+4990
3. Change in Operating & Depreciation	+143	+106	+213	+9691	+10282	+7330
4. Change in Realized Net Income (1+2-3)	+10	+27	+97	+678	+2619	+3338
5. Change in Realized Net Income Including Crow Payments	+10	+27	+97	+678	+2619	+3338
E. Pool Proposal (PIII)						
1. Change in Grain Receipts	+189	+25	+230	+12808	+2425	+7915
2. Change in Livestock Receipts	+28	+202	+254	+1898	+19595	+8741
3. Change in Operating & Depreciation	+169	+127	+336	+11453	+12319	+11563
4. Change in Realized Net Income (1+2-3)	+48	+100	+148	+3253	+9700	+5093
5. Change in Realized Net Income Including Crow Payments	+51	+122	+173	+3456	+11834	+5953

a Includes estimated Income-in-kind
b Includes all other Farms
c Based on Farm numbers in 1981

TABLE V - 2

IMPACT ON THE NET INCOME OF FARMERS IN AGGREGATE AND ON A PER FARM BASIS, OF ALTERNATIVE CROW RATE PROGRAMS, SASKATCHEWAN, 1990

Items	Farm Type	Aggregate			per Farm[c]		
	Grains & Oilseeds	Livestock	All Farms[b]	Grains & Oilseeds	Livestock	All Farms[b]
	- Million Dollars (1990 Dollars) -			- 1990 Dollars -		
I. Base Case Budget						
A. Receipts						
1. Grains & Oilseeds	5831	265	6193	103670	27481	90218
2. Livestock	619	745	1433	11005	77258	20876
3. Other Receipts	130	23	186	2311	2385	2710
4. Total Receipts (SUM 1-4)	6580	1033	7812	116986	107124	113803
B. Expenses						
1. Total Operating & Depreciation	5230	880	6334	92984	91258	92272
C. Realized Net Income[a]	1393	161	1531	24766	16696	22303
II. Impact Analysis						
A. Gilson (GIII)						
1. Change in Grain Receipts	+609	+15	+635	+10827	+1556	+9250
2. Change in Livestock Receipts	+125	+133	+274	+2222	+13792	+3992
3. Change in Operating & Depreciation	+426	+80	+526	+7574	+8296	+7663
4. Change in Realized Net Income (1+2-3)	+308	+68	+383	+5476	+7052	+5579
5. Change in Realized Net Income Including Crow Payments	+745	+106	+871	+13245	+10992	+12688
B. Compensatory Rate (CIII)						
1. Change in Grain Receipts	+509	+10	+529	+9050	+1037	+7706
2. Change in Livestock Receipts	+180	+190	+391	+3200	+19703	+5696
3. Change in Operating & Depreciation	+424	+88	+532	+7538	+9126	+7750
4. Change in Realized Net Income (1+2-3)	+265	+112	+388	+4711	+11615	+5652
5. Change in Realized Net Income Including Crow Payments	+702	+150	+876	+12481	+15555	+12761
C. Alternative to Gilson (AIII)						
1. Change in Grain Receipts	+575	+13	+599	+10223	+1348	+8726
2. Change in Livestock Receipts	+126	+135	+277	+2240	+14000	+4035
3. Change in Operating & Depreciation	+410	+78	+508	+7289	+8089	+7400
4. Change in Realized Net Income (1+2-3)	+291	+70	+368	+5174	+7259	+5361
5. Change in Realized Net Income Including Crow Payments	+617	+98	+732	+10970	+10163	+10664
D. Payments to Railways (EIII)						
1. Change in Grain Receipts	+668	+23	+804	+11876	+2385	+11712
2. Change in Livestock Receipts	+82	+88	+181	+1458	+9126	+2637
3. Change in Operating & Depreciation	+466	+80	+567	+8285	+8296	+8260
4. Change in Realized Net Income (1+2-3)	+284	+31	+418	+5049	+3215	+6089
5. Change in Realized Net Income Including Crow Payments	+284	+31	+418	+5049	+3215	+6089
E. Pool Proposal (PIII)						
1. Change in Grain Receipts	+970	+33	+1020	+17246	+3422	+14859
2. Change in Livestock Receipts	+154	+162	+335	+2738	+16800	+4880
3. Change in Operating & Depreciation	+589	+108	+723	+10472	+11200	+10532
4. Change in Realized Net Income (1+2-3)	+535	+87	+632	+9512	+9022	+9207
5. Change in Realized Net Income Including Crow Payments	+549	+102	+661		+10578	+9629

a Includes estimated Income-in-kind
b Includes all other Farms
c Based on Farm numbers in 1981

TABLE V - 3

IMPACT ON THE NET INCOME OF FARMERS IN AGGREGATE AND ON A PER FARM BASIS, OF ALTERNATIVE CROW RATE PROGRAMS, ALBERTA AND BRITISH COLUMBIA, 1990

Items	Farm Type	Aggregate		per Farm[c]		
	Grains & Oilseeds	Livestock	All Farms[b]	Grains & Oilseeds	Livestock	All Farms[b]
	- Million Dollars (1990 Dollars) -			- 1990 Dollars -		
I. Base Case Budget						
A. Receipts						
1. Grains & Oilseeds	3146	786	4175	111209	20407	54409
2. Livestock	510	4337	4994	18028	112600	65083
3. Other Receipts	124	240	814	4383	6231	10608
4. Total Receipts (SUM 1-4)	3780	5363	9983	133621	139237	130100
B. Expenses						
1. Total Operating & Depreciation	3087	4063	7984	109124	105486	104049
C. Realized Net Income[a]	715	1339	2067	25275	34764	26938
II. Impact Analysis						
A. Gilson (GIII)						
1. Change in Grain Receipts	+70	+3	+77	+2474	+78	+1003
2. Change in Livestock Receipts	+100	+698	+826	+3535	+18122	+10765
3. Change in Operating & Depreciation	+165	+271	+373	+5833	+7036	+4861
4. Change in Realized Net Income (1+2-3)	+5	+430	+530	+177	+11164	+6907
5. Change in Realized Net Income Including Crow Payments	+210	+533	+859	+7423	+13838	+11195
B. Compensatory Rate (CIII)						
1. Change in Grain Receipts	+12	-11	+1	+424	-286	+13
2. Change in Livestock Receipts	+143	+984	+1167	+5055	+25547	+15209
3. Change in Operating & Depreciation	+216	+367	+534	+7635	+9528	+6959
4. Change in Realized Net Income (1+2-3)	-61	+606	+634	-2156	+15733	+8262
5. Change in Realized Net Income Including Crow Payments	+144	+709	+963	+5090	+18407	+12550
C. Alternative to Gilson (AIII)						
1. Change in Grain Receipts	+52	-2	+52	+1838	-52	+678
2. Change in Livestock Receipts	+102	+716	+845	+3606	+18589	+10012
3. Change in Operating & Depreciation	+162	+268	+367	+5727	+6958	+4783
4. Change in Realized Net Income (1+2-3)	-8	+446	+530	-283	+11579	+6907
5. Change in Realized Net Income Including Crow Payments	+146	+523	+775	+5161	+13578	+10100
D. Payments to Railways (EIII)						
1. Change in Grain Receipts	+189	+35	+237	+6681	+909	+3089
2. Change in Livestock Receipts	+65	+461	+545	+2298	+11969	+7103
3. Change in Operating & Depreciation	+156	+220	+306	+5515	+5712	+3988
4. Change in Realized Net Income (1+2-3)	+98	+276	+476	+3464	+7166	+6203
5. Change in Realized Net Income Including Crow Payments	+98	+276	+476	+3464	+7166	+6203
E. Pool Proposal (PIII)						
1. Change in Grain Receipts	+301	+64	+389	+10640	+1662	+5070
2. Change in Livestock Receipts	+122	+844	+1000	+4313	+21912	+13032
3. Change in Operating & Depreciation	+278	+394	+630	+9827	+10229	+8210
4. Change in Realized Net Income (1+2-3)	+145	+514	+759	+5126	+13345	+9891
5. Change in Realized Net Income Including Crow Payments	+156	+604	+860	+5515	+15681	+11208

[a] Includes estimated Income-in-kind
[b] Includes all other Farms
[c] Based on Farm numbers in 1981

TABLE V - 4

IMPACT ON THE NET INCOME OF FARMERS IN AGGREGATE AND ON A PER FARM BASIS, OF ALTERNATIVE CROW RATE PROGRAMS, WESTERN REGION, 1990

Items	Farm Type: Aggregate — Grains & Oilseeds	Aggregate — Livestock	Aggregate — All Farms[b]	per Farm[c] — Grains & Oilseeds	per Farm[c] — Livestock	per Farm[c] — All Farms[b]
	- Million Dollars (1990 Dollars) -			- 1990 Dollars -		
I. Base Case Budget						
A. Receipts						
1. Grains & Oilseeds	10453	1728	12222	105276	29554	70065
2. Livestock	1253	16767	7637	12619	286767	43781
3. Other Receipts	342	612	1214	3444	10467	6960
4. Total Receipts (SUM 1-4)	12048	19107	21073	121340	326789	120806
B. Expenses						
1. Total Operating & Depreciation	9863	14389	17262	99334	246096	98958
C. Realized Net Income[a]	2262	4900	3958	22782	83805	22690
II. Impact Analysis						
A. Gilson (GIII)						
1. Change in Grain Receipts	+771	+27	+820	+7765	+462	+4701
2. Change in Livestock Receipts	+248	+907	+1317	+2498	+15512	+7550
3. Change in Operating & Depreciation	+711	+387	+1145	+7161	+6619	+6564
4. Change in Realized Net Income (1+2-3)	+308	+547	+992	+3102	+9355	+5687
5. Change in Realized Net Income Including Crow Payments	+1044	+759	+1955	+10515	+12981	+12207
B. Compensatory Rate (CIII)						
1. Change in Grain Receipts	+589	+4	+606	+5932	+68	+3474
2. Change in Livestock Receipts	+356	+1257	+1853	+3585	+21499	+10623
3. Change in Operating & Depreciation	+773	+482	+1347	+7785	+8244	+7722
4. Change in Realized Net Income (1+2-3)	+172	+779	+1112	+1732	+13323	+6375
5. Change in Realized Net Income Including Crow Payments	+910	+1017	+2075	+9165	+17394	+11895
C. Alternative to Gilson (AIII)						
1. Change in Grain Receipts	+711	+19	+749	+7161	+325	+4294
2. Change in Livestock Receipts	+252	+931	+1346	+2538	+15923	+7716
3. Change in Operating & Depreciation	+691	+385	+1119	+6959	+6585	+6415
4. Change in Realized Net Income (1+2-3)	+272	+565	+976	+2739	+9663	+5595
5. Change in Realized Net Income Including Crow Payments	+822	+736	+1694	+8279	+12588	+9711
D. Payments to Railways (EIII)						
1. Change in Grain Receipts	+995	+74	+1206	+10021	+1266	+6914
2. Change in Livestock Receipts	+162	+605	+871	+1632	+10347	+4993
3. Change in Operating & Depreciation	+765	+369	+1086	+7705	+6311	+6226
4. Change in Realized Net Income (1+2-3)	+392	+310	+991	+3948	+5302	+5681
5. Change in Realized Net Income Including Crow Payments	+392	+310	+991	+3948	+5302	+5681
E. Pool Proposal (PIII)						
1. Change in Grain Receipts	+1460	+122	+1639	+14704	+2087	+9396
2. Change in Livestock Receipts	+304	+1081	+1589	+3062	+18488	+9109
3. Change in Operating & Depreciation	+1036	+557	+1689	+10434	+9526	+9683
4. Change in Realized Net Income (1+2-3)	+728	+646	+1539	+7332	+11049	+8823
5. Change in Realized Net Income Including Crow Payments	+756	+828	+1694	+7614	+14161	+9711

a Includes estimated Income-in-kind
b Includes all other Farms
c Based on Farm numbers in 1981

TABLE V - 5

AGGREGATE EASTERN NET FARM INCOME IMPACTS OF CROW CHANGE BY PROVINCE/REGION IN 1990

- $ MILLION IN 1990 -

	Atlantic Provinces	Quebec	Ontario	Eastern Total
I. Base Case Budget				
A. Receipts				
1. Grains & Oilseeds	28	284	1393	1695
2. Livestock	807	4664	6465	11936
3. Other Receipts	262	454	1488	2204
4. Total Receipts (SUM 1-4)	1097	5402	9346	15845
B. Expenses				
1. Total Operating & Depreciation	860	4281	8386	13527
C. Realized Net Income[a]	253	1208	1041	2502
II. Impact Analysis				
A. Gilson (GIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-7	-34	-70	-111
3. Change in Operating & Depreciation	-5	-26	-60	-91
4. Change in Realized Net Income	-2	-8	-10	-20
B. Compensatory Rate (CIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-11	-51	-111	-173
3. Change in Operating & Depreciation	-8	-38	-91	-137
4. Change in Realized Net Income	-3	-13	-20	-36
C. Alternative to Gilson (AIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-7	-34	-72	-113
3. Change in Operating & Depreciation	-5	-23	-62	-90
4. Change in Realized Net Income	-2	-11	-10	-23
D. Payment to Railways (EIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-4	-21	-45	-70
3. Change in Operating & Depreciation	-3	-16	-39	-58
4. Change in Realized Net Income	-1	-5	-6	-12
E. Pool Proposal (PIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-9	-43	-94	-146
3. Change in Operating & Depreciation	-7	-31	-74	-112
4. Change in Realized Net Income	-2	-12	-20	-34

a Includes income-in-kind.

TABLE V - 6

EASTERN NET FARM INCOME IMPACTS PER FARM OF[a] CROW CHANGE BY PROVINCE/REGION IN 1990

- $ 1990 -

	Atlantic Provinces	Quebec	Ontario	Eastern Total
I. Base Case Budget				
A. Receipts				
1. Grains & Oilseeds	2144	5720	16861	11711
2. Livestock	61801	93947	78821	82474
3. Other Receipts	20064	9144	18141	15248
4. Total Receipts (SUM 1-4)	84009	108811	113823	109433
B. Expenses				
1. Total Operating & Depreciation	65860	86732	102242	93468
C. Realized Net Income[b]	19365	24333	12688	17288
II. Impact Analysis				
A. Gilson (GIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-536	-685	-853	-767
3. Change in Operating & Depreciation	-383	-524	-736	-629
4. Change in Realized Net Income	-153	-161	-117	-138
B. Compensatory Rate (CIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-842	-1027	-1353	-1195
3. Change in Operating & Depreciation	-613	-765	-1109	-947
4. Change in Realized Net Income	-229	-262	-244	-248
C. Alternative to Gilson (AIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-536	-685	-878	-781
3. Change in Operating & Depreciation	-383	-463	-747	-622
4. Change in Realized Net Income	-153	-222	-131	-159
D. Payment to Railways (EIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-306	-423	-549	-484
3. Change in Operating & Depreciation	-230	-322	-473	-401
4. Change in Realized Net Income	- 76	-101	- 76	- 83
E. Pool Proposal (PIII)				
1. Change in Grain Receipts	0	0	0	0
2. Change in Livestock Receipts	-689	-866	-1146	-1009
3. Change in Operating & Depreciation	-536	-624	-902	-774
4. Change in Realized Net Income	-153	-242	-244	-234

a Based on the 1982 estimated number of farms.
b Includes income-in-kind.

FOOTNOTES - APPENDICES

1. The first assumption is probably a reasonable approximation for the meat packing, feed milling and canola crushing sectors; however, it does do a certain amount of injustice to the livestock sector because the grain/forage mix can be varied according to market circumstances. The second assumption is less accurate, particularly in a short run or dynamic context. The analysis in this report is a long run comparative statics one where everything is assumed to adjust to a new equilibrium state. Besides, the problems lie not with the analysis but in the above explanation which has been adopted solely to avoid a longer and more complicated explanation necessitating the use of many diagrams.

2. It should be noted that the world grain price projections indicate real price increases to 1990-91. Hence, P1 in 1990-91 should be above the current world price. Likewise, P2 in 1990-91 should lie above the current farmgate price if Crow is left unchanged. P3 in 1990-91 could be either higher or lower. While these refinements could be incorporated into Diagram I-1, they would needlessly complicate the argument.

3. Canada, and therefore western Canada, is not simply a price-taker in world markets for processed statutory grain products, particularly livestock and meat. Expanded output from the west would have a slight depressing effect on North American livestock prices, which is the source of losses incurred by eastern Canada. The slight drop in price P1 in 1990-91 for processed output could be incorporated into Diagram I-2 but again at the risk of complicating the argument.

4. It has been argued that the methodology described above for measuring the RFP impacts on the west do not measure the net gains and losses from Crow change (Wogin, G. (1982)). According to this line of reasoning, what should be measured is the welfare triangles efi and nlr or wux. It should be noted that the impacts measured as these triangles would be substantially less than the estimates contained in this study; however, the direction of change would be the same in both cases. In general, the question is rather esoteric and without any significant policy implications. On the livestock side, it would seem to depend on whether additional resources, other than grain inputs, having a positive opportunity cost, would be drawn into expanded livestock production. In the case of the feedlot sector, this would be unlikely given the excess capacity that presently exists in the west. The case of the cow-calf sector is somewhat different. Cow-calf production will increase both from expansion on existing land as well as on marginal grain land that has been converted to pasture land following Crow change. What would seem to be involved, therefore, is a reorganization of resources within Prairie agriculture. Measuring only the triangles as has been

suggested would, moreover, only provide an accurate measure of the changes in social welfare if the long run grain and livestock supply curves can be interpreted as marginal curves. For a perfectly competitive industry, the long run supply curve is always an average cost curve but only a marginal curve under special circumstances (Curry, et al, 1971).

5. Gilson, J.C., (1982), Table V-2, page V-9.

6. Details on these volume projections are given in Chapter III.

7. op. cit; Table V-6a, line 4, page V-19.

8. op. cit; Table V-2, footnote, page V-23.

9. op. cit; Table V-2, footnote, page V-9.

10. Snavely, King and Associates, (1982), page 152. After the rail cost projections used in this study had been calculated, the Canadian Transport Commission unofficially adopted cost-of-capital rates of 20.5% and 19.5% for 1981-82 and 1982-83 respectively pending further analysis.

11. Gilson, J.C. (1982), page VI-6.

12. These policy options were applied in the same way as the calculations contained in the Gilson Report, Tables V-6A to V-6F.

13. Harvey, D.R., (1982), Table A.2, Appendix II.

14. Agriculture Canada (June 1982), Market Commentary.

15. Canada Grains Council (1982).

16. op. cit; Table A.1, Appendix II-4.

17. op. cit; Table A.1, Appendix II-4.

18. op. cit; Table A.1, Appendix II-4.

19. op. cit; Appendix II-1 contains a complete description of the methodology used in estimating the grain acreage RFP impacts.

20. op. cit; Appendix II-2 discusses these these multipliers in some depth.

21. op. cit; Appendix II-3.

FOOTNOTES - APPENDICES

1. The first assumption is probably a reasonable approximation for the meat packing, feed milling and canola crushing sectors; however, it does do a certain amount of injustice to the livestock sector because the grain/forage mix can be varied according to market circumstances. The second assumption is less accurate, particularly in a short run or dynamic context. The analysis in this report is a long run comparative statics one where everything is assumed to adjust to a new equilibrium state. Besides, the problems lie not with the analysis but in the above explanation which has been adopted solely to avoid a longer and more complicated explanation necessitating the use of many diagrams.

2. It should be noted that the world grain price projections indicate real price increases to 1990-91. Hence, P1 in 1990-91 should be above the current world price. Likewise, P2 in 1990-91 should lie above the current farmgate price if Crow is left unchanged. P3 in 1990-91 could be either higher or lower. While these refinements could be incorporated into Diagram I-1, they would needlessly complicate the argument.

3. Canada, and therefore western Canada, is not simply a price-taker in world markets for processed statutory grain products, particularly livestock and meat. Expanded output from the west would have a slight depressing effect on North American livestock prices, which is the source of losses incurred by eastern Canada. The slight drop in price P1 in 1990-91 for processed output could be incorporated into Diagram I-2 but again at the risk of complicating the argument.

4. It has been argued that the methodology described above for measuring the RFP impacts on the west do not measure the net gains and losses from Crow change (Wogin, G. (1982)). According to this line of reasoning, what should be measured is the welfare triangles efi and nlr or wux. It should be noted that the impacts measured as these triangles would be substantially less than the estimates contained in this study; however, the direction of change would be the same in both cases. In general, the question is rather esoteric and without any significant policy implications. On the livestock side, it would seem to depend on whether additional resources, other than grain inputs, having a positive opportunity cost, would be drawn into expanded livestock production. In the case of the feedlot sector, this would be unlikely given the excess capacity that presently exists in the west. The case of the cow-calf sector is somewhat different. Cow-calf production will increase both from expansion on existing land as well as on marginal grain land that has been converted to pasture land following Crow change. What would seem to be involved, therefore, is a reorganization of resources within Prairie agriculture. Measuring only the triangles as has been

suggested would, moreover, only provide an accurate measure o the changes in social welfare if the long run grain and livestock supply curves can be interpreted as marginal curves. For a perfectly competitive industry, the long run supply curve is always an average cost curve but only a marginal curve under special circumstances (Curry, et al, 1971).

5. Gilson, J.C., (1982), Table V-2, page V-9.

6. Details on these volume projections are given in Chapter III.

7. op. cit; Table V-6a, line 4, page V-19.

8. op. cit; Table V-2, footnote, page V-23.

9. op. cit; Table V-2, footnote, page V-9.

10. Snavely, King and Associates, (1982), page 152. After the rail cost projections used in this study had been calculated, the Canadian Transport Commission unofficially adopted cost-of-capital rates of 20.5% and 19.5% for 1981-82 and 1982-83 respectively pending further analysis.

11. Gilson, J.C. (1982), page VI-6.

12. These policy options were applied in the same way as the calculations contained in the Gilson Report, Tables V-6A to V-6F.

13. Harvey, D.R., (1982), Table A.2, Appendix II.

14. Agriculture Canada (June 1982), Market Commentary.

15. Canada Grains Council (1982).

16. op. cit; Table A.1, Appendix II-4.

17. op. cit; Table A.1, Appendix II-4.

18. op. cit; Table A.1, Appendix II-4.

19. op. cit; Appendix II-1 contains a complete description of the methodology used in estimating the grain acreage RFP impacts.

20. op. cit; Appendix II-2 discusses these these multipliers in some depth.

21. op. cit; Appendix II-3.